

COMMODORE User

Incorporating Vic Computing Volume 1 Issue 12 September 1984 UK Price 85p

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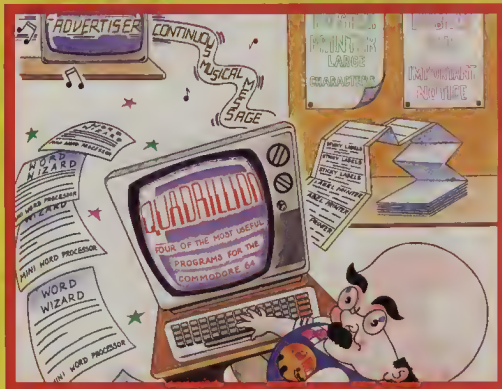
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Contents



Control your home with a Vic or 64: part one of a major series

Chris Durham starts a new series on using your Vic and 64 to do more practical things in the home. This month he looks at analogue to digital conversion. Or put more simply, how you can build a control box for your Vic or 64 to enable it to control a variety of electrical devices

The Forth dimension - part one: a do-it-yourself language



Firm in a series of these articles by dedicated Forth boffin, Richard Hunt. He starts by taking a gentle look at Forth from the beginner's point of view. All you need is a computer, an implementation of Forth and the will to discover more



Word processing round-up: Home Office reviewed

Chris Durham looks at a somewhat cheaper than usual offering this month, Androgene's Home Office. The package first appeared for the Vic and now for the 64, incorporating both a word processor and a database. That sounds like a tall order for the bargain-basement price of £14.95. Does the package even too much into too little?

Screen scene for Vic:



Another batch of Vic games-fodder for our review panel to get to grips with.



Fred on sound: what's a synthesiser?

We all know that the Commodore 64 is pretty impressive when it comes to sound, witness the sophisticated music that accompanies most of your favourite games. And it's all done by the diminutive SID chip. Fred Reed introduces SID and blows away the jargon behind synthesizers.

A superior database: Superbase reviewed



Lofly claims that the 64 can be used as a real business computer often founder in the wake of inadequate business software. But Superbase claims to be different: it's a database that compares favourably with packages for larger, faster and much more expensive computers. Karl Dallas takes a timely look at this modestly named package



Screen Scene for 64:

The latest games for the 64 - our review panel plays on.



Wedges and 64 Function keys - the listings:



You've waited long enough. At long last, the program listing that accompanies Chris Preston's 'All about Wedges' article in our June issue. And for good measure, the Basic program for the '64 Function keys' article counted (oops) from last month's issue



A bam for Bubble Bus:

From its sleepy village in the Surrey countryside, Bubble Bus has been busy making in games for the Vic and 64. And it's managed to carve a distinctive identity for itself in the process. Richard Kozicki dozzled his Wayfinders to visit the company's effervescent protagonists

Bigger Basic - looking at arrays:



Arrays are a very useful feature of Basic but they can cause problems for the budding programmer. Chris Preston shows up the problems and concludes that arrays are nothing to be frightened of



Tommy's Tips:

This month, Tommy gives some programming tips. Looks at RAM expansion and bugs in the Vic, and in-res multi-colour graphics for both Vic and 64. phew

Publisher *People* Annabel Hinz

Editor Bohdan Kozicki

Special Correspondents
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Chris Durham
Jim Gribble
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Chris Preston
Mike Todd

Editorial Assistant Nicky Chapman

Circulation Manager Nywel David

Production Manager Pat Holme

Art Maggie Underwood

Production Editor Mike Patterson

Advertising Julia West
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Deals for Readers Nicky
Ned and Vicki Staples

Editorial 01-251 6222

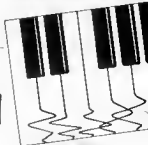
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Interpod goes cheap

Beginning with the bad news: Oxford Computer Systems, which markets the rather clever Interpod multi-interface device for the Vic and 64, is reportedly suffering severe financial difficulties. That means it will no longer be selling Interpod itself.

But the company is trying to put together a financial package that will enable it to continue selling the Oxford Pascal compiler and other software, including its Turbo 64 driving game.

Now for the good news, Parc Electronics, which actually manufactures Interpod, is now selling it through a company called Cheetah, a marketing outfit it's just acquired. And the price will be \$59.95, almost half of Oxford's hefty \$99.95 price-tag. Apparently, Oxford had ordered as many as 2,000 of the devices from Parc last March, before its troubles began to appear, hence Parc's desire to move stock quickly.

According to Parc's Laurence Louis, Cheetah will continue to support existing owners but we can't take over any guarantees issued by Oxford Computer Systems. That's regrettable but probably fair enough. More details on 01 833 4909.

SHORTS

Rabbit on the rocks: Yet another games software house has fallen on hapless times. This time, it's Rabbit Software, one of the largest producers of games for the Vic and 64, which went into liquidation a few weeks ago. Rabbit's internal troubles started some time ago, culminating in the death, earlier this year, of Alan Savage, its founder. No news yet whether Rabbit's range will continue selling.

SHORTS

Looking for clues: In case you're growing somewhat bald trying to solve adventure games from Level 9, here's a little news to stymie your hazy-headed brow. The company is now providing clue sheets. All you need to do is send a stamped-addressed envelope to Level 9 for complete clues on Adventure Quest, Dungeon Adventure, Lords of Time and Snowball. Why not include clues with the games? "There is too much temptation for the player to cheat and look up the answer to a problem," asserts Pete Austin, the company's adventure designer. If you haven't got a clue, write to: 229 Hughenden Road, High Wycombe, Bucks HP13 5PG.

Robots on the move



Prun Technology earned the dubious distinction early this year of launching the UK's first domestic robots (see Commodore User, March). But being somewhat pricey, Topo and Fred became less than household names. So Prun has moved down market and it is now offering a range of easy self-assembly robots called Morris, costing between £10 and £35 each.

There are five models, all use batteries and are activated by different types of sensor. Monkey (£9.99) crawls along a piece of string using arms activated by a sound sensor. Piper Mouse (£19.99) also has a sound sensor. But you're provided with a whistle that makes the device trundle in different directions. Then there's Lane Tracer (£17.99), which uses an

infra red sensor to crawl along a well-defined line. Pretty useful, ah?

More interesting and advanced are Circular (£23.99) and Memocow Crawler (£34.99). Circular rolls around on two large wheels controlled from a remote-control box. Memocow Crawler actually has some memory: it connects to a tiny 5-key keyboard from which you can program movements. Unclip the plug and it's off and away.

According to one Prun spokesman, the company is looking seriously into providing interfaces for the Cheetah so that it can be programmed from a Commodore 64 or other popular home micro. That sounds like a good idea but it still won't make the thing do more than crawl around, beep and flash its lights. Sounds rather like a traffic jam. More details on 01 263 2377.

Return of Tramiel

One-time Manhattan taxi driver and typewriter repair expert Jack Tramiel is back in the news. Avid Commodore-watchers will know him better as the recently departed founder and chief executive of Commodore International.

Tramiel left Commodore in the spring, sparking off an exodus of top executives who were later reunited with their leader in Tramiel Technologies, the company he set up immediately on departure.

But with his knack of being totally unpredictable, he's managed to surprise 'industry observers', and Commodore itself, by announcing that he's bought Warner's ailing Atari division. Apparently, Commodore itself had figured in the bidding unaware that its former leading light was lumbering up for combat.

Atari has had both a meteoric rise and an equally spectacular decline, which has enabled Tramiel to buy the company at bargain-basement rates, reportedly by merely taking over its rather larger debt.

With the deal comes Atari's not unimpeachable manufacturing facilities. So it's not surprising that speculation is rife that Tramiel intends to make an onslaught on the low-cost computer market - exactly the market Commodore has carved almost exclusively for itself in America.

According to Commodore big-wig, Gail Wellington, the news has surprised but not shaken Commodore: "we knew he was coming back but his buying up Atari has totally surprised us. The effect will be felt more in the States, though. We're virtually running a one horse race there in the low-cost computer market. So we reckon the competition will be good for us." If Commodore is force-feeding some grapes, it's certainly trying not to show it.

Try as it will, though, news has broke that Commodore International is seeking four of its former staff who left with Tramiel, for alleged theft of secret material referring to Commodore's 28000 chip project planned for next year. A court in Pennsylvania granted Commodore a temporary injunction against the beginning of July. So it looks like a case of adding bitter lemons to those aforementioned grapes.



Count of Mantissa: take in a little more on the shoulder?

GOSH is back

Avd readers with long memories will remember our mention of the Guild of Software Houses last October, which was set up to combat software piracy and bring the miscreants to justice. Well, the pirates are still afloat and GOSH, although it reckons to have issued about 10,000 tapes, still hasn't achieved a major coup.

According to chairman Nick Alexander of Virgin Games GOSH has had problems: "when you take legal action, you leave yourself open to counter suit if action is unsuccessful. So if you're not a limited company, the officers of the Guild become personally liable for any damages against GOSH".

So GOSH has formed itself into a limited company to ensure its members won't personally be liable for damages. And with its increased membership (it now stands at 38 software houses), it professes to be all set for renewed action.

"You can expect legal action soon," asserts Alexander, whose men unfortunately does little to suggest toughness "We're not

concerned about the likes of little Johnny. We're looking for the professional counterfeiter. This is organised crime. It's no use getting the guy who supplies the dealer; you have to follow the chain."

Strong words, but at least GOSH did have some examples of copied tapes to show at its recent press conference. One of them, ironically, was a remarkably accurate copy of an Imagine game, the company that's just gone bust. With copying of that standard, GOSH will have its work cut out.

So how much power does GOSH have? Alexander again: "We're levying a £500 annual membership fee which will enable us to employ a permanent secretary and establish a permanent office. We also have a fighting fund, a separate levy which varies on the software house's turnover." This fee is collected confidentially so the members don't find out how much money each of them are making - they're competitors, after all. The fund now stands at a moderately healthy £50,000. We wait with bated breath.

Pop goes Hercules

The software business must have a magnetic attraction for some members of the record industry. All set to join the likes of Virgin and K-tel is Interdisk, a software house financed by Island Records.

According to Interdisk's mainly modest blurb, Carol Wilson, its director has already acquired legendary status "by discovering and signing a number of megastars, including Sting, Human League, Orchestral Manoeuvres".

These probably go into insignificance when music is with her latest discovery the author of Hercules, Interdisk's first game for the Commodore 64. Called the Count of Mantissa, we're informed that "his present incarnation is not his first" (that rings true of a few pop stars), and that "he was one of Socrates' closest friends". Does this mean Socrates will be writing Interdisk's next game?

Still, the game might be a little better than the marketing hype. It's available on tape, costs £5.95 and features what Interdisk calls a Random Access Principle, on losing a life you're plunged randomly into one of the game's fifty frames. We've given a copy to one of our Hottelstein reviewers for a random review.

SHORTS

Maie Roundabout: Fan of Zeppelin and Dongal and Fanny and Dylan will be pleased to hear that Computer Power, a London-based software house, has acquired the rights to license a game based on the Maie Roundabout and its now legendary characters. The game is set to be available on the Commodore at the end of the year. Like many software houses, CPH is going to Spectrum market first. Details of the game's theme, yet, though. Hopefully, it won't be "one for bed" when you've finished playing.

SHORTS

Granada invasion: Television rental companies used to rent just televisions. Then they took the logical step of renting video recorders and video tapes. Now Granada TV Rentals, one of the biggest box renters in the UK (it's just bought up Rediffusion) has started selling home computers, including the Vic and 64 in its 100 High Street showrooms. It's also offering a range of software and peripherals. Prices look to be pretty standard with the rest of the High Street brigade. But will you be able to rent a computer? We'll, no.



SHORTS

Scope for members: Users of ISP Marketing's Scope games design package may be pleased to hear that the company has started a Scope Users Club which will run a quarterly newsletter and provide a telephone hot-line service to give technical advice. Membership is free to all existing Scope owners. You actually get a dinky little plastic card with the hot-line number boldly displayed with the words "strictly confidential." So to use the service, you must quote your membership number. The idea seems to be catching on: ISP reports that membership already exceeds 2,000. More details on 0286 79 6669.

TOTL for Vic

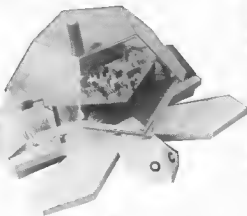
Vic-20 owners who were disappointed to read in our July issue that Thorn EMI is distributing only Commodore 64 versions of American TOTL Software's range of word processing packages, will be pleased that Atlantic Software in Kingston has been selling the Vic range for some time in the UK.

It has two versions of TOTL TEXT: 2.0 and 2.5. The former is for the Vic with 8K expansion. It offers full formatting control over line width, page length, margins, tabs, justification and spacing. Text output, editing and insertion are carried out in single mode. You get full cursor control and backward and forward scrolling. For that lot, you'll pay £13.95 for the cassette, or £14.95 for the disk version.

A little more expensive is Text 2.5 which requires 18K expansion and costs £18.95 on tape and £19.95 on disk. It has a few more advanced features like shorthand format commands, embedded footnotes, headings and footings, and printing direct to paper or disk files. Using TOTL Label (£11.95 on tape and £12.95 on disk), the package will merge labels from the address files created.

Both versions of Text support Commodore's graphics, and can be used with Commodore printers as well as Centronics and RS-232 printers linked with a suitable interface. More details from Atlantic Software, 18b Thorpe Road, Kingston, Surrey KT2 5EU.

Turtle soup



The House of Commons is not noted for its lightning speed of action so it's probably fitting that Valant Designs should use it as a venue for launching its new roving mechanical quadruped - a Turtle. That hi-tech reptile is now available for the Commodore 64 and most other leading home computers, for the very reasonable sum of \$190.

Turtle technology has been around for some time. But for the uninitiated, it's a robotic device used mostly in conjunction with Logo, a high-level programming language supposedly easier to learn than Basic for young children. Commands generated with Logo activate the turtle's sensors, driving it in various directions. Whether that leaves you excited or not, Valant's press blurb enthuses that it is "the most revolutionary step yet in teaching children computer technology".

So the message from Valant is that Turtles are good for kids. David Mellor, MP for Putney (he was there because Valant lives in his constituency) pontificated, "it's going to help a lot of kids to get into computers". Next came Technology Minister Kenneth Baker (he dropped in before going to lunch) who was "delighted to help in the development of this product". By which he means the government threw a few grants in Valant's way.

Valant's directors are noted for the number of letters after their names. But Tom Stouner, the man with the largest total (eleven letters) and a professor at that, got to make the speech. He perceived "an increasing shift to the home as a centre for education" (turtles roaming your living room?), and opined that "we must put the fun

back into education". One funny thing about Valant's turtle is that its eyes light up.

No strings

The device certainly does look like a turtle - more than can be said for previous offerings. And it's also pretty advanced, it's the first device to be remote controlled. So there are no restrictive wires to get in the way (including a mains lead as it runs off rechargeable batteries), its infra red transmitter plugs into the 64's user port. And that controls the turtle's movements and its internal pen which can be lifted or lowered for drawing.

The turtle comes complete with manuals and disk or tape-based graphics software. A turtle icon actually appears on the screen which mimics the movements of the physical device. That package gives you only a limited range of commands, so to get more from your machine you'll have to buy one of the implementations of Logo now available. Valant provides interface programs to enable you to run any of the popular versions.

The turtle was actually displayed running Commodore's own version of Logo, which costs £34.95 and for which you'll need a disk drive. Since quite a few Commodore people were hovering on the periphery, chances are that this may become the most popular implementation.

Commodore is making a strong push into the schools market so the combination of Valant's turtle and Commodore's Logo would seem especially attractive - but nobody was saying such. More details on 01 729 3947.

Wafadrive alive

For those of you who've sought in vain for an alternative to the sluggish and expensive Commodore 1541 disk drive, the new Rotronics Wafadrive may be a glimmer of light.

Appearing in September, it will cost around £190 and will be available for the Vic, 64 and the new 16 and Plus 4 machines. The device is designed and manufactured in the Far East by BSR, of record turntable and the now quiescent Aquarius home-computer fame.

So what's a Wafadrive? Well, it's a variation on the Sinclair microdrive theme. That means it doesn't use floppy disks like the 1541 but cartridges which carry an infinite loop of tape wound on a single spool (Rotronics call them 'wafers' which travel at much faster speeds than the humble cassette).

The Wafadrive contains two drive units and uses wafers of 16K, 64K and 128K capacities (they're pretty cheap at around £3-64 each). So you've got a maximum of 256K storage at any one time, compared with a lowly 51K for a 1521 floppy disk.

But the capacity (governed by tape-length) of the wafer determines the access time: that's the average time it takes to get at any one program or piece of data. Since floppy disk drives have random access, that time should be pretty quick. And since tapes work on a linear basis, they should be comparatively slow.

As it happens, Graham Booth, Rotronics' technical biffin claims that the average access time for both devices are pretty similar, at around six seconds. "The Wafadrive is a little faster using the 16K

wafers," he asserts. "But there's a trade-off involved. The 128K wafers give access within 47 seconds." That's slow on speed but comparatively high on data storage.

Like the 1541, Wafadrive connects through the Commodore serial port, but it's designated as device number seven. And Rotronics claims it "behaves in an almost identical way to the 1541 disk drive", and that "it can daisy-chain with other Commodore peripherals in the normal manner".

On the goodies side, it has built-in RS-232 and Centronics interfaces. There's an internal processor and some RAM (we don't know how much yet) which gives the machine some 'spooling' capability. That means it can output to a printer, for example, whilst the computer is performing another task.

Another likely goodie is its 'predictive loading facility'. What that means is, using a machine-code routine you can tell the drive to stop at whatever block you next require. That should speed access time up a little.

Apart from the potential problems of using device number seven, the major problem could be support for wafers from software houses. Rotronics must that "software titles will be available on wafers at the time of launch from various major software houses", and it hopes to achieve a mix of games, applications and utility packages. But we must wait and see.

A Wafadrive should be winging its way to us shortly for dissection from a reviewer. Meanwhile, more details from Rotronics on 0454 452757.



The Commodore version of Wafadrive is colour-coordinated and has a built-in power supply.

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Control your home with your Vic or 64

Part One of a series

by Chris Durham

This month we start a new series, on analogue to digital conversion, and vice versa. Or, to put it more succinctly, on using your Vic or 64 to run things. And, to be absolutely precise, on controlling your home (or bits of it) from your computer.

We dragged Chris Durham away from his word processor review marathon and set him to work to interface his 64 (and the Vic) to the big bad world: and over the next few months he'll be showing you how you can build, or buy, a system to control anything from a fan-heater to a robot.

And now for something completely different, as they say. Many readers will by now have read many reviews on games, business software, utility packages and the like, and many of you will have used many of the same themselves. After you've written your unimpeachable letter and shot down your billionth invader, though, you may be wondering whether there isn't something more you can be using your machine for.

Well, for those of you who balked at *Control the World*, here's your starter for ten. During the next few months the series will cover control of mains devices (lamps, heaters and the like), low-voltage control for relays and solenoids, and how to input signals to the computer from switches, bells and various forms of sensor like water alarms and central heating thermostats etc.

Full circuit diagrams will be given plus printed circuit board (PCB) designs for anyone handy with a soldering iron. For those who don't have the facilities to make their own boards we will also be covering commercially available products; something for everyone, in fact.

The point of it all

At this point some cynics may well be asking why anyone would want to use their computer to turn a light on and off, switches after all, are readily available and much cheaper!

Well, apart from the fact that it's fun to see what you can do with your machine, it is the interaction between the computer



and the environment around it that is being practised. Switching a light on and off is a simple way of demonstrating the techniques, once learned, these can be applied in more sensible applications. Like they could theoretically be used to control a nuclear power station with a Vic-20 (although I'd rather not be around when someone tries). To give a more practical example, by the end of this series you could have a system which detects the opening of the front door, turns on the lights, switches the kettle on and starts the hi-fi, providing it's between 4.30 and 5pm Monday to Friday. Try doing that with a simple switch.

Before you start getting too carried away with thoughts of a computer-controlled Utopia, though, let me run through a few drawbacks of such a system. First of all, the computer must be switched on all the time - otherwise you'll have to reset the time/date part of the program every time you start it up (unless you have an additional battery-powered clock module). And in case the horrible realisation hasn't struck you yet, you can't play *Space Invaders* while the computer's doing its control tasks. Bit of a drag, no?

Actually the latter comment is only partly true. I hope to show you how to use the computer for other things even as it is controlling things, though you will have to delve into machine code to do it; more of that later on in the series.

Only connect

In order to be able to influence events in the outside world we

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The title of 'genius' is not bestowed lightly on man or machine: those extraordinary qualities and powers of intellect are rare.

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COMMODORE 64 CASSETTE £7.95

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The Soul Gem of **ARTK**

U.K.



must have some form of connection between our computer and the device to be controlled.

Unfortunately, most electrical devices in the home that you might want to drive work either on mains voltages or from batteries of the 3, 6, 9 or 12V DC type with currents ranging from a few hundred milliamps (mA) up to 10 amps or more.

None of these can be driven directly from a computer that runs on 9V AC and 5V DC with a maximum current rating of only 100mA. What we need is an 'interface' which will allow the voltage/low current signals from the computer to control those very different voltages and current levels effectively – and safely.

A black box like that can be connected to the User Port of the computer, that allows us to access certain locations (or registers) within the memory, and this port also provides the power supplies needed by the interface. **Diagram 1** shows how the basic system will work – other methods of control that will be mentioned are merely variations on this theme.

The Mains Control Unit

The first thing we must do is build the interfaces that make the system work. There are a

number of ways of using low voltages (meaning 6 to 12V) to control higher voltages. The most common is via a relay, where a low voltage applied to a coil closes contacts which can carry both high voltage and current.

This approach suffers from the disadvantage that the coil itself needs a sizeable current (20–50mA) to operate it. Since the computer can only supply a maximum of 100mA from the User Port, this presents a problem if you want to control more than one device simultaneously.

There is, however, another device which will switch mains voltages – and which only requires 10mA at 5V, an 'opto-isolated triac'. Even this is not ideal on its own, being limited to about 1.6 amps on the mains side (enough only for a small lamp). But triacs can be connected in series to allow any size current up to 25 amps to be switched.

The solution, the circuit for this is shown in **Diagram 2** and is the one we're going to use for our mains control system. We will start with this basic unit and build up our system as we go on.

In order to make the most efficient use of our system, but at the same time cut down on the actual building, I have combined two of these circuits in each control box – enabling two devices to be controlled independently from one normal mains socket! You can of course build as many, or as few, of these control circuits as you wish in each box. The board layout for the twin unit is shown in **Diagram 3**.

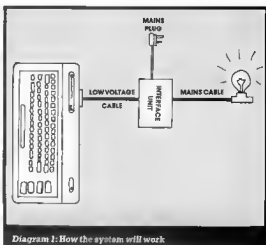


Diagram 1: How the system will work

Constructional details

The first thing to note is that we are going to be working with mains electricity. Whilst this is not dangerous if it's done properly there are certain precautions that must be taken.

- **NEVER** work on any device that is plugged into the mains – always remove the plug first
- **ALWAYS** check the wiring and construction thoroughly before plugging it in for the first time
- **ALWAYS** ensure that the plug is correctly fused and never attempt to exceed the 13 amp rating of the unit

The golden rule is that unless you are completely confident about what you are doing, get someone more experienced to help you.

The construction is very straightforward and uses readily available components. First, the Veroboard must be cut to the size shown (this is exactly half a standard 127x53 mm board).

Next, cut the copper strips in the position shown in **Diagram 3**. Now mark and drill the holes for the mounting points and the heat sink (the actual size will depend on your method of mounting – most pcb supports require a 4mm hole).

Note that the heat sink will be slightly offset when fitted and it will be necessary to drill an extra hole to allow both traces to be mounted on it (the heat sink is needed to maintain a current rating of the traces; without it their current-carrying capacity is reduced by over half).

When soldering the components, it is best to do so in the following order:

- wire links
- resistors
- traces
- connecting wires
- opto-isolators

Those opto-isolators can be mounted in a DIN socket if required, as shown in **Diagram 3**, in that case mount the sockets after the wire links, fitting the opto-isolators once all the soldering is complete. Ensure you observe the 'polarity' of the devices, the 'dot' indicates pin 1

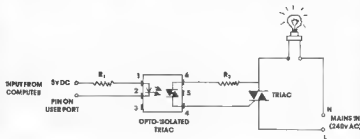


Diagram 2: Using a triac

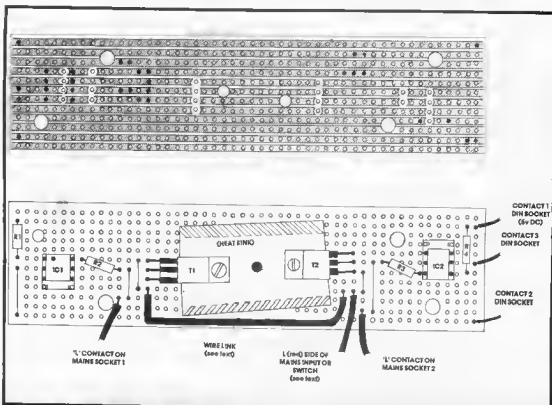


Diagram 3: PCB layout for a two-triac system

The traces used are rated up to 8 amps each, if you wish either circuit to control a higher current than this you must replace them with a suitably rated triac (note that the 'tab' must be isolated from all pin connections - check before you buy them).

Remember that if your control unit is to handle two devices, the total current for both must still not exceed 13 amper; this also applies if you fit more than two control units in a box.

The insulated wire link mentioned in Diagram 3 is there to reduce the current flow in the copper strip carrying the mains voltage, other mains connections are close together for the same reason.

Once you have built and checked the control board you can mount it in a box of your choice. The mains input lead should be terminated in a screw-terminal connector, the Earth and

Neutral wires are then connected directly to the output sockets. The Live wire is taken either directly to a board or to a switch (see Diagram 4 for switch connection details) - the switch would allow the unit to be powered up without the computer being connected. Two neon lamps are provided to indicate the state of each socket. The neons are wired across the Live and Neutral connections on the output sockets.

Rather than have a fixed lead to the computer, I have also fitted a 3-pin DIN socket to the side the lead from the computer can be plugged into that. The reason for this will become clear next month when we expand our basic system.

Testing the Control Unit

The first thing to do is make sure that the unit works. Check the

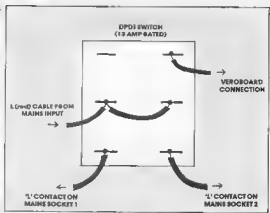


Diagram 4: Switch construction

	1	2	3	4	5	6	7	8	9	10	11	12	
	A	B	C	D	E	F	G	H	J	K	L	M	N

REAR OF USER PORT CONNECTOR		
PIN	CSM 64	VIC 20
1	GND	GND
2	+5v (100mA max)	+5v (100mA)
3	RESET	RESET
4	CNT1	JOY 0
5	SP1	JOY1
6	CNT2	JOY2
7	SP2	LIGHTPEN
8	PC2	CABINET SWITCH
9	SERIAL ATN	SERIAL ATN IN
10	9v AC (+ phase)	+9v AC
11	9v AC (- phase)	GND
12	GND	GND
A	GND	GND
B	FLA92	CS1
C	PS0	PS0
D	PS1	PS1
E	PS2	PS2
F	PS3	PS3
G	PS4	PS4
H	PS5	PS5
J	PS6	PS6
K	PS7	PS7
L	PS8	PS8
M	PS9	PS9
N	GND	GND

Diagram 5: The User Port

construction, especially to ensure that there are no solder 'bridges' between tracks on the veroboard. Ok? It's time to plug it in.

Items used for Control Box

- desk console type 2 (Maplin code = UH66W)
- two mains sockets (RS 469-425)
- DPDT rocker switch
- two mains resistors
- 3-pin DIN socket
- 3-pin DIN plug
- four PCB mounting pillars
- screw-terminal connectors

Supplier codes have been given for less common items. Note that RS Components Ltd do not supply items direct, you must obtain them through a dealer. Maplin does mail order and also has retail outlets; call 0702 554155 for details.

If you have a switch fitted, turn this to 'computer control' and plug the unit into the mains without any connection to the computer just yet. Plug a table light or something similar into each socket in turn; all sockets should be dead. Now turn the switch, if fitted, to the 'mains' position and reset all the sockets; this time the sockets should be live.

If you have a 4.5v or 6v DC supply handy you can now carry out a further test. Insert a three-pin DIN plug into the socket on the side of the box, connect the positive terminal to contact 1 on the DIN plug and then connect the negative terminal to each of

the other two contacts in turn. With the switch set to 'computer control', each socket should be switched on when the negative terminal is connected to its respective contact.

Connecting to the computer

For the twin unit single low-voltage three-core cable is needed plus a User Port connector and a three-pin DIN plug. The connections on the User Port are shown in Diagram

5 together with a description of each pin. Connect the wire from contact 1 on the DIN plug to pin 2, and the wires from contacts 2 and 3 to pins C and D respectively (subsequent control boxes should also be connected to pin 2 plus the next two data lines - E to L - in sequence).

Plug the User Port connector into the computer before switching it on. Now turn on the computer and type the following commands in direct mode:

CEM 64 - POKE 56578,258:
POKE 56577,255
Vic-20 - POKE 37138,258:
POKE 37138,255

You can now plug the cable into the DIN socket of the control unit; both mains sockets should be off. To control the sockets you can use the following code, where X is the socket number (1 to 8):

POKE 56577,PEEK(56572) AND (255-(2+(X-1))) to turn socket X on

POKE 56577,PEEK(56572) OR (2+(X-1)) to turn socket X off

That's for the 64. For the Vic, replace 56577 by 37138 in all occurrences. Don't worry for the moment about how the code works, all will be explained in greater detail next month.



Next month ...

At present we are using one line from the User Port to control one device; next month we'll show how to control eight devices using only four lines, with full latching, plus a program to give easy and simple control. For those who don't know one end of a soldering iron from the other we also look at some commercial units. Don't miss next month's instalment!

Component List

Resistors	
R1,4	390
R2,3	150
Triacs	
T1,2	RS T2850D
Opto-isolators	
IC1,2 - RS 308-196 (MOC 3020: 308-196 OMOC 3020: Maplin equivalent - Q410L)	
Hardware items	
Veroboard 127 x 31mm heat/sink (Maplin code - F05510)	
two 8-pin DIN sockets	
User Port connector	



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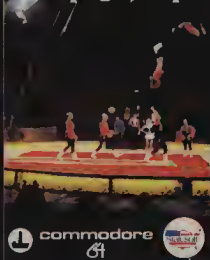
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The Forth Dimension:

Programming with a DIY Language

Part one – simple numbers

by Richard G Hunt

In this series of three articles I shall try to look at Forth from a beginner's point of view, introducing the more common Forth words and how they are used. The more advanced stuff I shall leave to the text books by Brodie and Winfield, at least for the time being

All you need is a computer with a Forth implementation and a will to experiment

These articles differentiate between Forth words (FORTH), input at the keyboard of specific keys (RETURN), input of direct commands > 25 + < and the system responses or output (such as MESSAGE # 1 OK, or EMPTY STACK OK). Some Forth systems may use upper- or lower-case characters. My use of upper-case letters is merely for clarity (and because the word processor I use is in itself rather simple).

Any new definition for entry to the dictionary will appear in this series as a standard colon definition. For example

**NEWWORD ELEMENT 1
ELEMENT 2 etc**

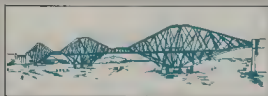
Note that all spaces are part of the syntax: two or more may be left between the name of the new word and its constituent parts.

Forth is an interactive language that you can experiment with at the keyboard. It is also a language that allows you to make up your own commands or words (indeed it insists that you do so) and causes them to 'run' a program. Given that Forth words are the building blocks of a program it is very much a case of DIY at the keyboard!

Such are the tools needed by the beginner to cobble together your first Forth program.

Forth programming starts out with a defined objective – which may be as grandiose as a fast Pacman game, or as simple as an additional entry to the dictionary. The objective must be clearly stated because strangely Forth seems to go against the normal rules of entropy – the effect must be defined before the cause is coded!

Supposing you have just acquired Forth and switch on for the first time. What do you see?



What must you do? The system will first display a message indicating which and whose version of Forth is loaded. This should tell you that the system is ready for you. You might press (RETURN) and see that the system responds OK: it's still ready for you.

You might try to add two numbers, say, display the sum of 2 and 3. For this you need the Forth words (+) and (!). The latter – the dot outputs numbers (specifically, signed integers) to the screen. It also operates on the data or parameter stack, which is the work area Forth uses for handling all numerical data.

If you are familiar with BASIC you might try to enter > . 2 + 3 <, assuming that you are giving a logical progression of commands. The system will not display what you expected.

Depending on the implementation you may see, EMPTY STACK, OK or MESSAGE # 1 OK, or even OK. These are some of several error messages caused by wrong syntax. But in this instance they're also indicative of Forth's requirement for postfix or Reverse Polish Notation (RPN) whereas the arithmetic operator (+) is placed after the operands (2) and (3).

It follows that any output command can logically only

follow the operation which produces the sum, product or whatever. If you now enter > 25 + < the system will respond 7 OK.

Now what happened?

The system has taken the numbers 2 and 5 and pushed them on to the data stack. If your system has a non-destructive stack contents display word (!S), try entering such word separately and then display the stack

```
>2<RETURN> OK
>5<RETURN> 2 OK
>5<RETURN> OK
>5<RETURN> 2 5 OK
```

... and so on.

Incidentally, here's a non-destructive stack print – courtesy of ICPUg

```
:DEPTH sp< 128 (VIC, or 123
C-64) swap - 2 /
: S or depth if sp< - 126 (VIC,
121 C-64) do 1 0r - 2 + loop
else "stack empty" then :
```

It can then be seen from our example that the last or topmost number on the stack is the one on the right, or last to be displayed – as with all stacks a FILO (first in last out) system applies.

When an operator like (+) is encountered, the system looks to the stack for the required

number of operands, it then pops them off the stack and replaces the result on the top of stack (TOS).

(!) looks for only one parameter, and pops it off the stack and on to the screen. The other mathematical operators – which are (-), (*), (/) function similarly, as do the logical operators – (&), (>), (<) (0=), and so on.

Forth supports mixed function operators also such as (/), (/mod) (mod) and others that relate to double or unsigned numbers, about which more anon though (/mod) is a variant of (/) that leaves the quotient and remainder on the stack, very useful bearing in mind that Forth employs only integer arithmetic. So if you enter 2001 20.01 200 1 and 2001 Forth will display them all as 2001.

The textbooks correctly indicate that handling Forth numbers – which means use of the stack, RPN and integer arithmetic – is worth practising. The concept is that if the programmer can order the mathematical operations correctly before coding the machine response in Forth becomes that much speedier than using conventional algebraic ordering systems and floating point arithmetic. If you now wish to take pen and paper and try factoring out a quadratic equation to fit RPN, please feel free: there'll be no help from me!

Next time, we'll come to something more interesting and put together a few new word definitions. Until then try using Forth as a calculator, using the operators + - * / MOD.

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Word processing and more?

Home Office reviewed by Chris Durham

Home Office has been available for the Vic-20 for some time. So it's not surprising that a version has now surfaced for the 64. But it's still a tape-based program costing £16.95. For the money, you get two programs: a word processor and a database. And at that price you're bound to be asking suspicious questions. Chris Durham finds out if this package really does do the jobs intended for it.

Wordpro — the writer

Those of you who have been following the series on word processors will know that there are three functions that any WP program must be capable of doing reasonably well: it is to be of any use at all; these are inputting text, outputting text and editing text. A weakness in any of these areas tends to reduce the program's usefulness to the user.

Inputting text

On the first of these, Wordpro is adequate and no more, the cursor keys are all disabled so that the only way to correct an error while you're still typing the line is to delete all the text back to the error and then retype it. You bad if you made a mistake on the second letter and only noticed it halfway along the line.

The line length is usually limited to 55 characters, although this can be altered by adjusting the margin settings if needed. When the word you are typing is too long to fit on the line, it hyphenates the word at the last character position, however if you type a word that ends just short of the full line width then the cursor automatically steps on to the next line, thus in practice very few words get split. This is one of the nicer functions of the program.

The program uses two lines on the screen to give one line of printed text, so every other line suffers from wrap-around, which makes it a little difficult to read. It also gives problems when editing, of which more later.

There are five tabs available and these must be set up when you begin your document. Tabs are selected by using the "key, pressing it as many times as the required tab number. Because the program uses standard keys like " for the tab and " for returning to the menu, you can't use them for text.

There is a way of getting

round this problem if you're using an Epson printer, but not otherwise, my immediate and slightly uncharitable thought was 'who on earth is going to spend nearly £300 on a printer then buy a cheap WP like this?'

Another key you cannot use under any circumstances is the quotation mark or (shift) key; rather a vital key for word processing I would have thought! What's wrong with the function keys? They use them for printer selection when it doesn't really matter so why not in the main section?

The maximum number of lines allowed depends on the line width, but is 324 with a default line width of 55 characters. This is quite adequate for the sort of thing you would use this program for.

Printing the text

You have two basic options with this program: you can either use a Commodore printer attached to the serial port, or a Centronics parallel printer plugged into the User port using the program's built-in interface. Note that a Centronics printer connected with a converter to the serial port will not work as it prints a 6 at the start of each line. The program appears to send a control character at the end of each line, although this could be a combination of the program and the interface. But it does work well with just a cable connection to an Epson from the User port.

Printing can be right justified, in other words the right hand margin can be made straight by padding out each line with extra space between words. The result is all one could wish for, except it does it in slow motion on the screen: half a line at a time before sending it to the printer; totally unnecessary and a complete waste of time and programming effort. The effect of watching it happen is totally incomprehensible anyway, and the program writers would have been better off spending more time on the important bits.

Various options are allowed after selecting the print option from the menu; there are facilities to set the point type, emphasis, double spacing etc. These have been well thought out on the whole. The only restriction is that the options apply to the whole document, you cannot print some lines or words emphasised, and some normally. The majority of the options are selected using the function keys. Headings and initial blocks of text can also be centred.

Editing

I have left this till last because it is without doubt the part of the program which puts it beyond the pale. It is the worst method of editing I have ever seen on a wordprocessor, including some costing only £6! Basically it uses a line editor that wouldn't be so bad if you could actually edit the line, but you can't even do that. You actually have to retype the whole line in full, even if the only error was a single wrong character. Adding text to a line is impossible unless it is a small word which can be squeezed on within the line limit. The only alternative is to insert a new line. This is fine if you want to add a whole line, but very annoying if you only want to add one long word.

Since the text is completely limited to the line it's on, it does not sort itself out if you delete a few words (by not retyping them), what you end up with is a large gap at the end of the line. There is a whole line deletion option, but if you want to delete all but the last two words and they won't fit on the next line, you have a problem.

Neither are these facilities for block moves or for copying, perhaps not surprisingly at that price, but what it means is that this is a WP program with fewer editing options than the 64's Basic editor. I find that quite incredible.

Files can be saved to both tape and disk and loaded again

very easily. These functions worked well and all errors were tracked. There is an option in the main menu to load the directory; a useful facility which does not destroy the contents of memory.

Database — the clerk

This is billed as "a highly sophisticated Storage and Retrieval system... designed for the home or small office." If you leave off the 'highly sophisticated' part, that isn't too unfair a description of this program. It is designed to allow you to store a number of single line records, about 380 if you limit the record to 80 characters. As a crude lookup file with the ability to sort the single key field, it is quite effective, mainly uses being a telephone directory, stamp catalogue or record catalogue — and these may not be as mighty useful.

Creating a file

This is very straightforward; you are asked to specify the record length, the default being 80 characters. But you can't specify any kind of structure to the record since it's all on one line with no punctuation of any type allowed. That means that the only way to separate information within the record is with spaces; any attempts to use commas, full stops, colons and causes the record to be rejected or it ignores everything after the 'bad' character.

Once you have specified the record size you can start inputting the data. The first thing to specify is the 'key'. This is any alphabetic string up to 20 characters and it is this key that is used for searching and sorting. After that, you will see a white bar which represents the maximum length of the record. In total contrast to the WP program, here you must use the Delete key otherwise the white 'bar' gets shortened as well; you can only edit using the cursor keys

This really represents pretty poor programming where the user is forced to adapt to the program's inadequacies, rather than making the user's life easier. I know it's the cheap end of the market, but—

When you have input the first record you are returned to the main menu and must reselect the 'new data' option, you repeat this procedure until all the records have been entered. You can now select option 7 which will sort the records into alphabetical order. This is reasonably fast for a program written in Basic; it also enables the search routine to find records much faster.

Accessing records

There are two main ways of getting at your data again, either by searching the file for specified records or by typing the whole file out on the printer. If you wish to search for a particular record then option 3 asks for the key; a good point is that it allows you to specify part of a key, to find all records which match. For example specifying SM as the key in a directory would find Smith, Smyth, Smeethen, Smithwans etc. Whenever a record is accessed in this way you have the option of changing it or printing it. But two pitfalls await you. If you select the change option by mistake, or change your mind after selecting it, then there is no way of aborting it; you must retype the entire record again.

If you are an optimist like me, you might expect that pressing Return without making any changes would retain the existing record. In fact it deletes it, the key remains, but the data field is blanked! Not that it tells you, you have to re-search for the record to discover what you have just done. It would have been nice if you had to confirm the change; after all, the WP program does just that. The second pitfall occurs if you select the wrong printer stream, the program does warn you that the printer must be on line, but when using a parallel printer on the serial port I hit 'p' instead of 'r' by mistake. The result was a crashed program and a lost database — be warned.

Saving and loading

As with any database system, you really need disks. By the time you have loaded the program from tape, run it, loaded the data from tape, found the record and printed it, you would

have been quicker looking up the entry in a card index. Life is much faster with disks. Even a reasonably large file loads fairly quickly and the search routine is not too slow, even so it is only on large amounts of data that you will really see the benefit of storing it on computer. This is not a criticism of this program since it applies to all similar small databases.

Accessing the disk directory is straightforward, being an alternative to saving or loading after making the initial selection. As with the WP program, no data is lost when accessing the directory.

The manual

This covers both the WP program and the database, is 20 pages long and perfectly adequate. Although there is no index, the contents page is sufficient to find your way to all the sections. My only real bone of contention was the advertising-type blurb which almost contravenes the Trade Descriptions Act! Gross examples include 'offers facilities far in advance of any other program available to Commodore 64 users at many times the price' and 'this Word processor has been set up for maximum speed and efficiency'. Whoever wrote that had obviously never used it!

Conclusions

The Database program is adequate for what it sets out to do, bearing in mind the price. Provided you are aware of the limitations and the pitfalls, it can help to maintain data in an orderly format and will not cause you too much frustration.

Unfortunately the same cannot be said for Wordpro. Even taking price into account I really cannot recommend this wordprocessor for anything other than playing about. The frustrations which the appalling editing facility imposes would guarantee that many people will find it easier to put pen to paper than to try to retype a document which has more than a few minor errors.

I am disappointed and not to say a little surprised at Audiogenic since the (comparatively) expensive WP program they sell, Wordcraft 40, is very good. Why they have agreed to sell Home Office when it can only damage their reputation for



good software I really don't know. The writers have tried to put too much into too small a

program at too cheap a price — the result is that even at this price it's not worth the money.

Summary of facilities

Use of 64 facilities	1
Editing	0
Ease of use	1
Output formatting	2
Printer support	2
Document size	2
Manual	2
Disk-type facilities	3
Mail merge	0
Error handling	3
Spelling check	0
80-column option	0
Overall facilities	1
TOTAL POINTS	17

(Each field is scored out of 5)

Home Office on balance

For

- Comes complete with Database program
- Has built-in Centronics interface
- Price

Against

- Very limited facilities overall
- Extremely poor editing facilities
- Text does not appear on screen as it will be printed

Under review

Home Office

Description:	Combined wordprocessor and database for the 64
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Our regular round-up of games reviews

We get to see a lot of games here at Commodore User, so many in fact that we can't handle all the reviewing ourselves - we farm out some of them, which is why our reviews have someone's initials at the end of them. We look at everything we get, but we don't necessarily print all the reviews we write: instead, we tend to stick with (a) all the best games we come across and (b) those games that you're most likely to find in the shops or the mail order ads.

MAX

Vic-20 (unexpanded)
Joystick or keyboard
Price £4.95

Anirog describes Max as a charming furry creature who used to live on a far away planet. He probably wishes he stayed there as he now spends his time hopping around squares on a pyramid, chased by a snake. As tradimon now has it, Max's sole aim is to change the colour of the squares. The snake's aim is directed solely at Max, who loses one of his nine lives if their paths collide.

Unfortunately, Max looks more like a boiled egg and the snake looks like a lollipop on legs. And the game itself looks suspiciously like another Q-Bert clone.

That said, it gets pretty difficult if you've managed to muster enough enthusiasm to stick with it. The snake gets nastier and squares revert back to their original colour if Max lents on them twice. Difficulty apart, sound and graphics are pretty rudimentary. One nice feature is that you can change screen and border colours, but only at the beginning of the game. All in all, pretty mediocre stuff. **BB**

Anirog

Presentation: ☒ ☒
Skill level: ☒ ☒
Interest: ☒ ☒
Value for money: ☒ ☒

ANIROG



VIC 20 UNEX.

BRAIN PAIN

Vic-20 (unexpanded)
Joystick or keyboard
Price £3.5

The game that forces you to think! In this excellent version of the family game of Parts, up to six players can have a riotous time, or you can play on your own against the clock. Move the cursor to your chosen position using either joystick or keys, press the appropriate button to reveal the image, then move on to try and find its pair. The pain comes when trying to remember where the very one you want is hiding.

There is also an edit facility for you to change any of the pictures and create your own. Great fun for the family, and very impressive for the unexpanded Vic-20. **WG**
MicroAntics

Presentation: ☒ ☒
Skill level: ☒ ☒
Interest: ☒ ☒
Value for money: ☒ ☒

UNEXPANDED VIC 20



micro-antics

ASTRO FIGHTERS

Vic-20 (unexpanded)
Joystick or keyboard
Price £4.90

This space duel is one of the very few games that is two-player only - one uses the joystick, the other the keyboard. Each player is the pilot of an Astro Fighter, whose task is to destroy his opponent's ship whilst avoiding some of the random dangers around his fighter craft.



This is a very simple game, with poor sound and poor graphics. There is precious little to say about it and not much more to say for it. **WG**
Sunlock Electronics

Presentation: ☒ ☒
Skill level: ☒ ☒
Interest: ☒ ☒
Value for money: ☒ ☒

STARSHIP ESCAPE

Vic-20 (+16K)
Joystick or keyboard
Price £5.90

According to the cassette blurb, this is "a compelling and exciting real time graphic space adventure game" - and they're right - it is!

You are a lonely little pilot of a Federation scout ship, travelling through an unknown sector of the galaxy, when you come upon a gigantic starship which proceeds to draw your craft into its cavernous interior. Your craft is then disassembled and the parts distributed in various rooms about the ship.

Your unenviable task is to search each room for the parts, overcoming the dangers that await you, and bring each part back, one at a time, to the airlock. When you have retrieved all the parts of your craft, you then have to re-assemble the ship and make your escape.

That megastak is not made easier by the alien occupants whose chief role in life is to catch you and return you to the airlock. The starship is in the malevolent power of the Force Cloud Entity (whose course is to -Editor), whose purpose is unknown to the



human race (again somewhat like our Editor!) except that they capture any earthship in their path and imprison its occupants.

Your attempts to collect the parts of your ship are made harder because the Force Cloud may appear at random, just as you are about to collect a part from a room. If you're not quick enough it may take your part away from you; or worse still, catch you and put you back in the airlock. It cannot be killed so you have to manoeuvre out of its way.

But you do have a faithful companion cynically called X9. He helps to attract aliens away from you, so that you can get on with the business of collecting the bits of your space ship. He will disappear when you leave the room to lose himself again in the ship. To find him, and to show you where you are, there's a Map/Time Stop facility which shows you and your X9's position. In all good value for money, and should keep you occupied until well past your bed time. **WG**

Sunlock Electronics

Presentation: ☒ ☒
Skill level: ☒ ☒
Interest: ☒ ☒
Value for money: ☒ ☒



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ARTIST RAIDER

ALICE SOFTWARE
SHARK ATTACK

ALICE SOFTWARE
MOONS OF JUPITER

ALICE SOFTWARE
TIME DESTROYERS

WILL NOT BE THE
SUPREME WORLD
CHAMPION!

WILL YOU BE THE
SUPREME WORLD
CHAMPION?

WILL YOU BE THE
SUPREME WORLD
CHAMPION?

WILL YOU BE THE
SUPREME WORLD
CHAMPION?

Ramtek is bringing out such a lot of games for the Vic that it's decided to lump together four of its elder offerings into a *Bumper Pack*, costing £13.98 - that's about half what you would have paid for them individually. We haven't reviewed the games before, so here's your chance to find out whether the pack really is a bumper bargain.

MARTIAN RAIDER

Vic-20 (unexpanded)
Joystick or keyboard

This is a spin-off from *Skramble*. No you don't get the whole course, there being four sectors to marauder through, blasting and zapping three different ground targets. Section one has you destructively avoiding missiles a change of colour scheme heralds the arrival of the cyan yo-yo saucer, accompanied by wobbly noises the wailing noises will alert you to the purple meteor shower (they really should be indestructible); now we are over the yellow rocket city, still carefully picking off the foal dumps to prolong our flight; end of the course and round we go again.

A colourful adaption of an arcade standard, well worth having if you don't own Amuro's 16K version. Good use of colour and sound.

SHARK ATTACK

Vic-20 (unexpanded)
Joystick or keyboard

Not unlike the superb *Stix*, for the 64 the idea of the game is to spread a yellow net over as much of the black screen as possible, at the same time neutralising the movement of four obnoxious cyan sharks. Daily two long and they will break from and disintegrate their bonds to lead you a merry dance. Success in occupying a sufficient area of the screen and up pops level two with a couple of green octopuses (octopi only to Latin speakers). They are not just for show; touch them and you loose a life. Each success will land you with two extra molluscs to work around. Now all that sounds like an unusual challenge to me, possibly spoilt for some by the background melody but if the worst comes to the worst you can always turn down the volume.

Now for the overall evaluation of the package.

Presentation: ****
Skill level: ***
Interest: ****
Value for money: *****

TIME DESTROYERS

Vic-20 (+8 or +16K)
Joystick or keyboard

Not the best *Defender* clone on the market but certainly action packed. Faults: first a slightly fussy protector craft and the scrolling/acceleration wasn't instantaneous.

There is no call to rescue humans, just deny the aliens the material they need in order to mutate. Three different combinations of opponents to choose from, but everyone will be most interested in the most complex level. Here you will compete with the likes of green landers, purple super-droids: the odd mother ship and white spider craft, which disgorges swarms and blue horseshoe-magnets busily spreading space mines everywhere. Zap or be zapped, you've got your work cut out to survive in this arena.

MOONS OF JUPITER

Vic-20 (+3, -8 or +16K)
Joystick or keyboard

This game is graphically superb but where do the space-like effects come from? My guess is that fast alternating screens are employed to produce the illusion... anyway, whatever tricks are used, the result is a success. Note also the lunar-style cratered surfaces of the asteroids, they of course need cutting down to size, three times in all before they finally melt. UFOs slide in, accompanied by a whining hum, to add complexity and extra targets. But don't expect to blast the Colossus, the most you can hope for is to lure them into debris by cunning movements of your rocket.

Three levels, each using different and spectacular colour combinations. If this game doesn't appeal... there is just no pleasing you.

LS



BC BASIC

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Spike

by S Johnson

This might be just the game for the Vic-20 owners who don't get on very well with spiders. The game runs happily on a Vic without expansion.

You're trapped in a room with one of these eight-legged creepy crawlies, a highly poisonous variety, according to the author. Your job is to attack it from above, and kill it using a spike which you manoeuvre from the keyboard - manoeuvrability is pretty good, too. Don't worry, the program itself contains all the necessary instructions.

To make matters more challenging, the spider spins a web as it moves near the walls. Touch any of the walls, the spider or its web and you lose a life. There are also nine levels of play (which govern the spider's speed as it blunders around) and a high score display which updates the level.

This is quite a simple game with nothing startling in terms of graphics and sound. But it is original and pretty challenging at higher levels. Definitely more fun than keeping spiders in a matchbox.

VARIABLES USED -

A,DA - attacker movement
V,VE,VX - spider movement
CA - attacker colour
CV - spider colour
EX,W,QJ,VH - flags
LI - lives remaining
HS,SC - high score, score
TL - time limit
X1,X2,Y1 - loop counters
PPA - peek variables
L - level
VO - volume

HOW IT RUNS -

Lines 1-3 initialises game
Lines 4-16 main program
Lines 18-28 spider movement
Lines 30-42 attacker movement
Lines 43-46 checks for collision
Lines 47-80 collision sound
Lines 81-89 loss routine
Lines 90-97 instructions
Lines 98-103 sets up graphics
Lines 104-107 sets level,
turns sound on
Lines 108-110 sets up screen
Lines 111-113 win routine

```
1 PRINT"ICLS11SCR)PLEASE WAIT" GOTO73
2 GOSUBRHS-9
3 LI=3 TL=600 SC=0 VH=0 EX=0 VO=3679
4 GOTO84
5 A=8139 V=7848 CA=36853 CV=38268
6 POKER,27 POKER,CA,2 POKER,28 POKER,CV,3
7 TL=TL-1 IF TL<0 THEN TL=180 THEN
8 PRINT"THANKS",TL/180,"ICLS1"
9 IF TL<1 THEN PRINT"ICLS1" GOTO83
10 GOSUB16
11 IF VH=1 THEN 47
12 GOSUB20
13 IF A=1 THEN 96
14 IF EX=1 THEN 47
15 GOTO6
16 IF VO<613 THEN VE=-VE
17 VH=0 Q=32
18 IF EX<0 THEN 10 THEN 67
19 VX=INT(RND*(8)*2) IF VX=0 THEN VX=-1
20 VE=INT(RND*(8)*2) IF VE=0 THEN VE=-1
21 VE=VEXR IF PEEK(V+VE)<32 THEN GOSUB43
22 IF CV<77258 MOVE<20 THEN RETURN
23 IF VH=0 THEN 25
24 IF VH=1 THEN RETURN
25 IF Q=25 THEN 28
26 POKER+VE,28 POKER+VE,3 POKER,0 V=V+VE CV=CV+VE POKER,5875,225 POKER,5876,8
27 VH=V+1 IF VH=5 THEN VH=0
28 RETURN
29 3=0 PAPERK(137)
30 IF P=54 THEN RETURN
31 IF P=33 THEN DA=-1
32 IF P=33 THEN DA=1
33 IF P=26 THEN DA=1
34 IF P=33 THEN DA=22
35 IF P=33 THEN DA=23
36 P=PEEK(A+DA) IF P=32 THEN 39
37 IF P=26 THEN 31 THEN 41 RETURN
38 IF VO<27 THEN 41 RETURN
39 POKER+DA,27 POKER+CA,2 POKER,32 POKER,5875,225 POKER,5876,8
40 DA=DA+CA-CA-DA
41 RETURN
42 VH=0
43 IF PEEK(V+VE)=255 OR PEEK(V+VE)=255 THEN VE=-VE Q=29 RETURN
44 VH=1 RETURN
45 POKER+HTOGS FOR G=0 TO 7 POKER,20+G2 POKER,X2 POKER,Y2 1,28+(18*H2)
46 NEXT G
47 POKER,CA,2 POKER,VO-1,8
48 FOR T=1 TO 5000 NEXT
49 LI=LI-1 IF LI<0 THEN VH=0 EX=0 POKER,32 POKER,CV,3 A=8139 V=7848 GOTO4
50 PRINT"YOU MUST DROP ON THE 125PC1103 SPIDER FROM ABOVE,(48PC1103)HPALING HIS
51 YOUR LEFT 1103 SPINE.
52 PRINT"THANKS LUCK - YOU LOST!" PRINT"12C0114CR31HIGH SCORE"HS
53 PRINT"4C0112C03ANOTHER DO? (VX)12C01"
54 DETR8 JFR8 "THENS
55 IF R8="H THEN POKER,5868,248 POKER,27 PRINT"ICLS1" END
56 IF R8="V THEN LI=3 A=0 POKER,32 POKER,CV,3 A=8139 V=7848 GOTO3
57 GOTO3
58 PRINT"ICLS112C01"TR8(7)"GRN)SPIKE (RED)11"
59 PRINTTR8(7)"BLK)1REV1(8C11BLU)"
60 PRINT"14C01"
61 PRINT"YOU MUST DROP ON THE 125PC1103 SPIDER FROM ABOVE,(48PC1103)HPALING HIS
62 YOUR LEFT 1103 SPINE.
63 FOR T=1 TO 5000 NEXT
64 PRINT"ICLS112C01"
```



```

66 PRINT "YOU LOSE A LIFE IF YOU COLLIDE WITH THE WALL,THE WEB OR THE SPID
67 PRINT"(2C2D)IF YOU RUN OUT OF TIME(2C)THEN YOU ARE KILLED(3SPC1C2D)INSTANTLY."
68 FORT=102000 MD,T
69 PRINT"(2C2D)YOU HAVE THREE LIVES."
70 FORT=105000 MD,T
71 PRINT "LO,MY FRIEND(3SPC1C2D)HOW'S"
72 PRINT"(3SPC1C2D)"REVIS(5C+3)
73 PRINT"(3C3R13C1)3SPC3P(3SPC1+13SPC3P5
74 PRINT PRINT"(3C3R) 30AN(3SPC1+13SPC3P5
75 PRINT PRINT"(3C3R) LEFT(3SPC1+3SPC3P5
76 PRINT PRINT"(3C3R)RIGHT(3SPC1+13SPC1+13C2D)
77 RETURN
79 FOR%6666,255 POKE%5,28 POKE%2,28 CLR
80 FOR%1=16407679 POKE1,PEEK(1+25000) NEXT
81 FOR%1=730470407 READ POKE1 A,N
82 30102
83 IF(LC3D)THEMT
84 INPUT "2C1R4H1CH LEVEL(1-9)"A
85 IF(LC1C2D)STHEN85
86 POKE%1,255 POKE%1,9 PRINT"(LC3D)
87 POKE%1,PEEK(1C2D) POKE%1,255 NEXT
88 FOR%1=7702791645TAP2C1 POKE1,255 NEXT
89 FOR%1=7702791645TAP2C1 POKE1,255 NEXT
90 FOR%1=384227039505 IFPEEK(1-3872001)32THEPOKE1,4 POKE%0-3,200 POKE%0-3,8
91 NEXT1
92 PRINT "HON(3C1C3L1) FOR%1=10701 PRINT"%1, NEXT
93 POWER 27 POKE%2,2 POKE%3,2 POKE%3,3
94 00705
95 POWER,27
96 FOR%1=0704 FOR%2=12870293 POKE%0-2,2%1%2%3 POKE%1-6,12870293 POKE%0-2,2%2%3
97 NEXT%2 POKE%3,3 NEXT%1 POKE%0-2,2
98 POKE%2,2 FORT=10200 MD,T
99 PRINT"(LC3D)12C2D(3C3R)ELL DONE"
100 PRINT"(LC3D)4C2D YOU SCORED"5C"
101 SC=INT(L*4*10/L*10)
102 PRINT "(2C2D)4C2D YOU SCORED"5C"
103 PRINT "(2C2D)1
104 IFSC=2H100H=9C PRINT"100"
105 PRINT"100H SCORE"5H
106 FORT=102000 MD,T
107 007054
108 DRAC%55,219,219,126,69,24,24,24
109 BATA%55,153,59,60,24,102,157,165
110 ZATA%59,56,59,26,36,60,66,129

```

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CUS

FRED on Sound

Why did I choose the Commodore 64 out of all the other micros on sale a year ago? One of the reasons was that the 64 was rumoured to have excellent music/sound capabilities; and judging by the accompaniment to several games I have the sources were right. But it seems anyone without patience and knowledge of machine code is likely to be pretty browned-off with all the POKEs involved, the lack of information available, and the limitations of Basic!

The heart of the 64's sound system is its SID chip (SID stands for 'Sound Interface Device'), and the chip is directly controlled by registers set up in the computer's memory. These registers are located from \$4272 (\$D00 hex), to \$8286 (\$7FF hex).

Synthesis of a synthesiser

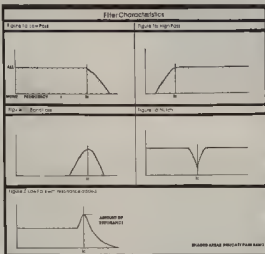
A synthesiser consists of three basic blocks - namely Source, Treatment and Control. The 64's sources are three 'voices', each working independently of the others to provide the 'raw' sounds and noises for the Treatment section.

Each voice consists of four different sounds, any of which can be enabled individually or in combination (the science of adding different sounds together is known as 'additive synthesis'). And of course each voice can play any of 68,835 pitches spread over a range of eight octaves - an octave is a 'doubling' in pitch.

The Treatment section comprises a filter, a ring-modulator - also known as a 'four-quadrant multiplier' - and a facility for synchronizing voices. Of these, the most useful item is the filter.

The 64's filter can operate in three different modes: low pass, high pass and band pass. In low pass mode, the filter will progressively reject all sounds above the cut-off frequency (as set in registers \$4293 and \$4294, D418 and D417 hex). In other words, in low pass mode the filter will only pass low sounds. In high pass mode, of course, only high frequencies are passed and all other sounds are rejected. Selecting band pass mode will reject both low and high frequencies, and pass only sounds close to the cut-off frequency (known as the centre frequency). For those of you who understand such matters, the filter has a 12dB per octave rolloff.

This is not the end of the story though, by selecting both low pass and high pass, we have a fourth mode known as the notch or band reject mode; see figure 1. A fifth mode also exists,



although SID makes no provision for it, known as no pass or phase shift.

Resonance

One of the most important functions of a filter is to provide resonance. The high four bits of the register at \$4293 (\$D417 hex) control the resonance of the filter (the lower four bits control which voices are fed through the filter). Resonance acts to boost the frequencies just before the cutoff or centre frequency (see figure 2). This gives you the ability to closely emulate the natural resonances of real sounds.

For example, oboes and bassoons have a strong resonance that emphasizes the first and second harmonics. It is this resonance, largely due to their physical construction (wooden tubes), that gives them such a distinct tone. A flute or piano, on the other hand, has most of its natural resonance 'designed out' to make very pure sounds, and their inherent character is due to other factors - largely their amplitude envelope

The ring modulation function is normally only found on expensive synthesizers, and unlike other forms of treatment is derived purely mathematically. Consider a ring modulator as a 'black box', with two inputs and one output. The box determines the frequency of each input, and performs the following calculation to produce the output $f_o = (f_1 + f_2) \text{ and } (f_1 - f_2)$. Let's take an example: take an input waveform, say a sine wave (a sine wave contains only one frequency - it's fundamental), at a frequency of 300Hz, and a second input, the same shape but a frequency of 100Hz. Using our formulae, the output waveform contains frequencies of $(300 + 100) \text{ and } (300 - 100) = 400\text{Hz and } 200\text{Hz}$.

As you can see, we now have two outputs mixed together, coincidentally an octave apart. Using the facilities offered by SID, the nearest we can get to a pure sine wave, is a triangle wave. Triangle waves contain not just their fundamental frequency, but a few higher frequencies called harmonics. The ring modulator performed its

calculation on all the input frequencies, not just the fundamental. This means the output waveform will be a lot more complex than either of the two inputs. Imagine the result of a sawtooth modulated with a square (pulse) wave!

If you are careful, some excellent bell-like sounds can be produced by this method.

The ADSR envelope

In the world of natural sounds, a note does not sound the same through its duration: certain important factors change with time. For example, a note played by drawing a bow across a violin string will build its volume quite slowly, hold its maximum volume for as long as the bow continues to move, and then quickly die away.

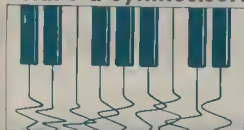
A note played on the piano, on the other hand, will reach its maximum volume quite quickly, then fall off slowly until the key is released and it's finally out of completely by the damper.

The four 'phases' of a note are called Attack, Decay, Sustain and Release (the whole concept is often known as 'ADSR' or 'envelope') and these parameters can be used to control volume, tone and other effects throughout the duration of a note. On the 64, each voice has its own 'envelope generator' of the ADSR type, set up to control the volume of that voice. This envelope can also be used to control the filter and certain other functions.

All in all you haven't a hope of trying to control all these things by yourself: so Commodore provides a computer to control everything for you! To write a program to accomplish all this is the art of making music from a penance to a pleasure, a surely a job for a professional programmer... unless you have a package to help you.

Next month, Fred will be looking at three commercially available synthesizer packages for the 64: Synthix 64 from Abacus, Unisynth from Okulicki and Romik's Multisound Synthesizer. Stay tuned.

What's a synthesiser?



The SID map

Decimal	Hex	bits	Function
54272	D400		Voice 1 Frequency low byte
54273	D401		Voice 1 Frequency high byte
54274	D402		Voice 1 pulse width low byte
54275	D403	7-4	unused
54276	D404	3-0	Voice 1 pulse width high byte
			Voice 2 Frequency low byte
		7	Noise 1 = on
		6	Pulse 1 = on
		5	Sawtooth 1 = on
		4	Triangle 1 = on
		3	Test bit 1 = on
		2	Ring modulation 1 = on
		1	Synchronize voice 1 with voice 3
		0	Gate bit 1 start attack, 1 start release
54277	D405		Envelope generator 1 attack/decay
		7-4	Attack cycle duration 0 to 15
		3-0	Decay cycle duration 0 to 15
54278	D406		Envelope generator 2 sustain/release
		7-4	Sustain level 0 to 15
		3-0	Release cycle 0 to 15
54283	D415	7-3	Unused
		2-0	Filter cutoff frequency low nybble
54294	D416		Filter cutoff frequency high byte
54295	D417		Filter resonance/input select
		7-4	Filter resonance 0 to 15
		3	Filter external input = yes
		2	Filter voice 3 = yes
		1	Filter voice 2 = yes
		0	Filter voice 1 = yes
54296	D418		Filter mode and volume
		7	Disable voice 3 output = yes
		6	High pass mode 1 = on
		5	Band pass mode 1 = on
		4	Low pass mode 1 = on
		3-0	Output volume 0 to 15
54299	D41B		Oscillator 3 random number generator
54300	D41C		Envelope generator 3 output

Voice 2 and 3 registers are the same as voice 1, add 2 to the address for voice 2, and add 14 for voice 3.

by Fred Reid

A glossary of synth terms

AMPLITUDE: the magnitude or volume of a wave

ATTACK: the first time-phase of a note, normally measured in milliseconds

BANDPASS: a type of filter, passing only frequencies near its center frequency

CUTOFF: the frequency at which a filter stops passing sound

D/A: digital to analogue converter - enables digital equipment (like computers) to control non-digital equipment

DECAY: the second time-phase of a note, normally measured in milliseconds

DYNAMICS: the difference between quiet and loud, the range of volume or effect

ENVELOPE: a graph of a particular quality of a sound, plotted against time

FILTER: a device that progressively acts to remove sounds outside its pass band

FREQUENCY: literally, the number of times a waveform repeats itself. Normally measured in Hertz (repetitions per second)

FREQUENCY MODULATION: as effect whereby the amplitude of the waveform acts upon the frequency of another

FUNDAMENTAL: usually the lowest frequency found in a complex sound, or the lowest note in a chord - the 'base' note

GATE: a signal kept 'high' (or 'on'), while a note is being played (see SUSTAIN)

HARMONIC: a higher note added to the fundamental, giving the note character

HIGHPASS: a filter that acts progressively on sounds below its cutoff frequency

LOWPASS: a filter that acts progressively on sounds above its cutoff frequency - the most common filter type

MODULATION: the technique of 'affecting' one function with another

NOTCH: a type of filter whose pass-band is either inside of its center frequency

Useful for removing persistent hums and buzzes

OCTAVE: the range in which a musical note is placed. Technically, moving an octave up is the same as doubling the frequency of the note

OSCILLATOR: a device that produces waveform. Also known as 'tone generator'

PITCH: same as FREQUENCY. The higher the pitch, the higher the note

PORTAMENTO: this means a smooth glide between two notes, usually done automatically

PULSE: either a single on/off cycle used for control purposes, or a chain of pulses known as a pulse wave

PULSE WIDTH: the ratio of 'on' to 'off' period in a pulse or pulse wave

RELEASE: the final time phase in a sound, normally following the end of the gated period

RESONANCE: the amount of 'lift' given to a filter at its cutoff frequency. A vital part of synthesis

RING MODULATION: a purely mathematical function producing an output equal to the sum and difference of the two input frequencies. Useful for 'bell' sounds

SAWTOOTH: a wave shape containing all harmonics in a certain proportion. Sounds like its name

SINE: (sinusoidal) the most natural and pure sound of all. Contains no harmonics

SQUARE: a wave shape containing only odd harmonics (1st, 3rd, 5th etc), similar to pulse wave but of fixed on/off ratio (ie 'square')

SUSTAIN: the third time phase of a note, usually expressed as a level maintained during that phase

SYNCH: Synchronisation - a technique in which two notes are combined without altering their pitch

TIMBRE: the tonal quality of a sound, affecting its character

TRIANGLE: yet another wave shape - similar to a sine wave, but with some harmonics. Sounds 'flutey'

VCA: Voltage-Controlled Amplifier - a hangover from the days of Dr Robert Moog. Normally referred to now as 'ADSR'

VCO: Voltage-Controlled Oscillator - another hangover from yesteryear, see OSCILLATOR

WAVEFORM: a regularly repeating sequence of shapes, normally plotted as a graph of amplitude against time

WAVELENGTH: the physical length of a sound wave, normally measured in metres

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SUPERIOR

database

Superbase reviewed

by Karl Dallas

TS/NEWS

Attempts to make the 64 look like a 'real' business computer have sometimes floundered in the awkward gap between a marketing person's imagination and the software-writer's abilities. The idea of using the 64 to create, maintain and retrieve files is great: the practice is such that most so-called 'database' packages for the 64 are slow, memory-hungry and (above all) restricted.

As its immodest name implies, Superbase claims to be somewhat different - a 'professional' package for the 64 that aims to compare favourably with anything available on larger, faster and more expensive computers.

It is well-reported, and it is selling well too. We thought it was about time we checked out the claims...

Make no mistake about it, Superbase 64 is an extremely sophisticated disk-based information management system. The number of individual databases, records in a file, key files, memo files (including help screens) and 4K applications programs possible is limited only by the size of your disk. So anyone using 5250 disk drives via an Interpod or some other IEEE interface would find it more powerful still than someone limited to the plodding 1541.

Superbasics

Each database can handle up to 15 different linked files - making it possible, for instance, to link a file of customers names and addresses with an invoices file, so that it's not necessary to keep more than the customer's name on the letter. Three files can be held in memory at a time and any two can be linked (the link can be revised with an **ELINK** command).

Each record can contain up to 127 fields, 31 of which can be either calendar, result or constant fields. The record can be spread across up to four screens. The maximum length of a text field is 255 characters; key and constant fields are limited to 30 characters. Numerical fields can be up to nine digits with up to four decimal places, plus one sign character (+ or -). Date and calendar fields may be expressed as either seven or nine characters, with three-letter month designation coming either first or second. The case of the month designation (i.e. capital or small letters) is not significant, so that it will accept either Jun404,

24/Jun84, 24/Jun84 or 24/JUN84. Impressive, no?

The built-in applications programming language contained in the system is also good. It uses 21 of the common Basic commands and 19 common functions, plus 30 special Superbase commands (see the table). Superbase programs are limited to 4K in length - though chaining is possible - and they are held as sequential files. They can be RUN only from Superbase.

In addition to the help screens supplied, which can be edited by the user, it is possible to set up user-defined help screens for use with specific applications.

Only one key field is possible in any field. But by use of the **MATCH** command it is possible to perform a search based on any field. Duplicate keys are possible, but that's likely to create confusion when reading files, so they're probably best avoided.

The program contains a useful report generator, which can also be used for writing the simpler applications programs.

Six different printer definitions are available; you get programmable parameters for baud rate, data word length and number of stop bits (the default value is for a CEM dot matrix printer). Left and right margins, paper length, text length, line feed on/off, line speeds or continuous print can also be selected.

Installation

The program comes on a single system disk (in duplicate, since back-up copying is impossible)

with a very impressive manual. That consists of a 58-page tutorial, an 81-page reference section, and a 32-page programmer's guide - sketchier than it seems, since fully 24 pages are devoted to the commands. There is a lot of programming information within the tutorial, however.

The appendices include details of the system values, data storage file manager, listing of the start-up program (which can be modified by the user), a five-page explanation of the program's special error messages, RS232C control registers, and six pages of glossary.

Early versions had no index to the manual, but this has now been rectified with a fairly good seven-page offering. The Superbase part of the Superoffice manual, reviewed below, is however unindexed.

The program is **LOADED** with the command...

LOAD "SB",S

and then the screen displays the usual Precision multi-colour preliminary sequence for about two minutes - until it clears, goes grey, and displays the message.

**REMOVE PROGRAM DISK
INSERT DATA DISK AND
PRESS RETURN
OR
PRESS F1 TO CREATE DATA
DISK**

A data disk containing the start-up program, help files and a tutorial database called **TRAINING** will be created if **F1** is pressed - re-formatting and erasing any data on the disk in the process. Just in case you

have pressed the wrong key, the program forgivingly advises you that:

**ALL DATA ON DRIVE 0 WILL
BE DESTROYED
ARE YOU SURE?**

Even if you have a twin-disk drive, this is done in a laborious single-disk manner. First the disk is formatted; then you're advised to insert the source disk, loading the data into memory. Now you are told to insert the destination disk and repeat the process: total time taken, including formatting, is about 3½ minutes.

After setting up the new data disk, the system shuts down and you have to **reLOAD** Superbase once more.

Booting a ready-prepared data disk takes about 20 seconds in comparison. Again, there is no provision with twin-disks for inserting system disk in drive 0 and data disk in drive 1, and booting automatically.

Getting started

Unless you change it, the start-up program loads the **TRAINING** database and offers you a choice of two files called **CUST_REC** and **CUST_INV** for the quite useful invoicing application which is contained in the second part of the Tutorial.

Before you get that far, however, this manual teaches you first how to set up a simple names-and-address database. That includes such interesting low-res graphics devices as 'inverting' (reversing) a line (or the whole screen) to highlight certain text; and using **CTRL** plus 1, 2 or 3 to change the screen colours (which are saved with

the screen format when you file it to disk). It doesn't seem possible to insert the field entry areas, which is a shame.

It's also possible to obtain an instructional audio cassette which takes the user through both these applications, for those of you who prefer the spoken word to the written.

This isn't bad. But rather uninterestingly for those familiar with the 64 the cassette starts with a rather long-winded intro to the keyboard system etc.

Using Superbase

Once a record format is defined, new records are created primarily through the ENTER option - this displays a clear record format on the screen for the operator to fill in.

An alternative method of adding records is available in the SELECT sub-menu. A 'browse' feature allows the user to flip through records backwards and forwards, to edit, replace or add records, or to enter any number of criteria to search for a particular record or set of records.

Criteria for record matching may also be specified in the FIND option. The match may be defined as any text string or numbers; in field "and" and "or" combinations, in field "greater than" and "less than" combinations, partial and sliding matches, within field or record. Multiple criteria may be entered, using the record format as a template. The whole operation is extremely easy.

Other key Superbase functions include BATCH CALCULATION and SORTING. CALC is the main evaluation command; it can be used to change the contents of any type of field within records, obtain values in memory variables for totalling or other purposes, or as an instant calculator on the Superbase command line. BATCH is an easy way of applying the operations available in CALC across a file or set of records.

Instant applications

At this level Superbase is an extremely easy-to-use menu-driven program. And the provision of the new Homebase and Stepping Stones applications makes it even easier. Four Homebase applications packages are available, priced at £17.95 each.

Homebase 1 includes Birthday File, Freeriser File, Sports Results File.

Homebase 2 offers Bookcase Diet and Television files.

Homebase 3 has Holiday Hi Fi (actually gramophone records) and Sportstar files.

Homebase 4 gives you Address, Gardening and Midman files, but the way the address records are set up is slightly differently from that in the Tutorial.

Ten Stepping Stones packages at £9.95 include Cash Book, Sales Day Book, Purchase Day Book, Job Costing, Stock Records, Accountants Time Recording, Solicitors Time Recording, Club Membership, Estate Agents, and Travel Agents.

Surprisingly, these more professional disks come with no documentation (which perhaps explains the low price). But you do get very full help screens. I think this will change, because Precision tell me they have already received some adverse comment on the lack of written material - though of course the program makes it very easy to print out the help screens as a kind of mutant manual.

All these applications can be edited by the user to customise them. Getting inside them is probably the hardest way of coming to grips with the Superbase programming language - which is what really makes the package so powerful.

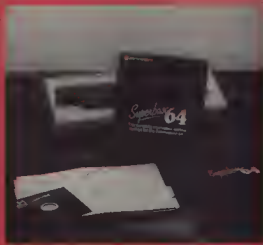
Superbase programming

As I've said, anyone with any experience of computer use should find Superbase a doddle to use. It's all menu-based and almost impossible to crash. The worst that can happen is that you may get yourself into a record entry mode by accident, and have to enter a dummy record because until you've typed something into the key field it won't let you go anywhere else.

But if the data entry is to be handled by a non-computer person, or if the idea of developing applications packages for sale appeals to you, you must get into Superbase programming. It's as easy as Basic, and a lot easier than machine code or assembler.

The table (right) lists Basic commands that are recognised. Some of these are self-explanatory. CONT has a different meaning from the identical Basic command; here it specifies continuous or discontinuous print.

SAVE and LOAD relate to sequential program files on disk and no device number is



Basic-style commands in Superbase

CLR	GOTO	REM
DATA	IF...THEN	RESTORE
DIM	LIST	RETURN
FOR...NEXT	LOAD	RUN
END	NEW	SAVE
GET	ON	STEP
GOSUB	READ	STOP

Basic-style functions in Superbase

ABS	INT	RIGHT\$
ASC	LEFT\$	SIN
ATN	LEN	SQR
CHR\$	LOG	STR\$
COS	MID\$	TAN
EXP	PI	VAL
FRE		

Superbase Commands

ACROSS	EOF	QUIT
ALL	EOL	RESTART
ASK	FROM	RLINK
BRKOFF	IS	RMARG
BRKON	LFEED	SAVE
CLEAR	LINK	SCREEN
CONT	LMARG	SET
CONVERT	LOAD	SETLINK
DATABASE	MENU	SPACE
DATE	NMAT	STORE
DETAIL	PDEF	SUBTOTAL
DISPLAY	POEV	TITLE
DO	PLEN	TLEN
DOWN	PLUS	TOTAL
DUMP	PMAT	WAIT
ELINK	PRINT	WHERE
ENDREPORT	PROTECT	

The Superoffice combo

Superoffice claims to be "the ultimate Commodore Office Administration System". It is a combination of Superbase and Precision's Superscript II word processor on a single disk, allowing easy movement between the two programs without losing memory in either, and allowing access of Superbase data to the word processing part of the combination. It runs only on the now obsolete 8096, the 700 series, and the new 8296 business machines (though it doesn't - yet - utilise the 128K memory within the 8296).

Actually, the user has two options on power-up. You can have either a combined Superbase/Superscript II, providing a 'short' text area of 132 lines of 80 characters, or a so-called 'long' Superscript (300 lines x 80 characters), with integral spelling checker including 30,000-word dictionary, but no Superbase. It's possible to move from 'short' Superscript to 'long' by typing in...

LOAD*0*SUPERSPELL*

... from the Superbase main menu. Moving in the opposite direction is not possible, however, without reLOADing the main program.

I give the combination only two cheers, mainly because some of the changes that have been made to Superscript. The original was a very friendly word processor; it could convert most other WP files to its own conventions, and since it stored its data as sequential files it was very easy to access them for use by other programs.

The new Superscript can still convert most other text files to its own format, even including the main formatting commands. But its own files are now much harder for another program to get into.

Also, Superscript and Easy Script had very similar commands, bearing in mind the different CBM machines they were intended for. Anyone familiar with them will have to start virtually over again to learn how to use Superscript II. If you're upgrading from one of the earlier versions, and had either Easy Spell or Superspell, your carefully built-up dictionary is now useless; and there seems to be no way of merging the old-style dictionary with the new one.

Whatever happened to upwards-compatibility, which always was such a feature of Commodore hardware and software?

The main thing I didn't like about Superscript II, however, was its slowness to react to the keyboard. I thought Wordcraft was slow enough, but there is a discernible delay between pressing a key and seeing its result appear on the screen. Not only is this slightly disconcerting, but it is actually possible to lose characters - especially double-letter combinations "travelling", for instance, is likely to come out as a Yankee-style "traveling", "kdnepper" as "kdnaper", etc.

Of course the spelling checker will catch such system-induced errors. But it's an unnecessary complication.

The manual is enormous: a two-inch thick A4 binder, containing a general introduction to both programs and an entire Superbase manual followed by an entire Superscript II manual. For some reason the Superbase has no index, which is bad news.

One improvement on this 96K version of Superbase is that setting up the data disk has a twin-drive option. But there's still no way of booting automatically from drive 0 to a data disk in drive 1.

Like Superbase 64, the system disk is uncopyable, which I think is a mistake. I know dongles cost a few bob, but they do allow the user to swap programs around various media, which one sometimes wants to do.

I gather that a future version may take advantage of the extra memory available in the 700 and 8296, probably by including the spelling checker in the 'short' option.

Superoffice costs £850.

needed. PROTECT makes it impossible to LIST or edit a program file.

Several of the commands can be abbreviated, like Commodore Basic keyword 'quit' is QUIT, for instance. And many can be used from within programs or in direct mode from the main menu, for instance, PRINT in direct mode will redirect all output to the printer until the DISPLAY command is typed. So PRINT, LIST, DISPLAY will list the current program to the printer and return to screen display after the LISTing is concluded.

Each command has at least half a page in the manual with programming examples some get a whole page.

It's clear from the level of support Precision is planning that the company sees Superbase as a major product, and I think they're right. They have established a hotline for users' enquiries (ring 01-330 7166 and ask for Brian Leaffield), and there's talk of an independent users' group. Since I plan to use Superbase regularly, perhaps anyone interested in forming such a group, or interested in joining one, might like to drop me a line c/o Commodore User

me. Precision has put together a series of packages that take the new home or office user into the system with the minimum of trouble.

If you've got the impression that I am enthusiastic about Superbase, you'd be right. It's not cheap, but it's still better value for money than some of the cheaper so-called databases around. The programming language is an extremely interesting feature, enabling the programmer to produce really transparent data entry sequences for use by unskilled staff. Not on the other hand, the tyre who stays within the menu system will find it quite easy to handle.

Verdict? On the plus side there's Superbase's ease of use, its documentation, the development potential, and these applications packages. Against it is the laborious single-drive set-up, even on double disk drives. Overall? Excellent!

Superbase in the States

Superbase 64 won the top Showware Award in its category at the Consumer Electronics Show held recently in Chicago.

After a more than seven months on the US market, its sales there are running at around 9,000 units a month. This latest award in the highly competitive category of Innovative Personal Productivity Software is further evidence of the product's overall technical excellence and market appeal.

Peter Thomas of Precision Software (USA) commented: "The Showware Award is great news for Precision's credibility in the States. We've always been confident of Superbase's considerable merits and this award justifies our position as an emerging market force in the US Commodore software arena."

Last words

If ever proof were needed of the power and potential of the seemingly humble 64, this program provides it. Because it is one of the most powerful database packages on the market more powerful than many written for its ostensibly bigger brothers in the CBM 8000 business class. For instance it is available for the 8096 (and the new 8296) only in an 800 combination of Superbase and the Superscript II word processor, called Superoffice.

Of course, powerful packages often need powerful intellects to drive them, and you really need your wits about you to take the fullest advantage of everything that Superbase has to offer. Even then, for dummies like you and

Under review

Superbase 64

Description:

Database package with in-built programming language

Supplier:

Precision Software

Address:

Park House
4 Park Terrace
Worcester Park
Surrey KT4 7JZ

Telephone:

01-330 7166

Summary:

Excellent file-handling system for raw beginners and programming sophisticates alike

Price:

£100 (inc VAT)

COMMODORE User

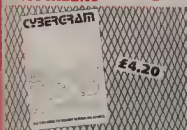
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for Vic or 64

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Our reviewer (June 1983 issue) concluded that Elmsoft's OSIRIS assembler was "good value at the price." So we signed up to sell it.

Fast, commonsense operation, good features and lots of them. In all error reporting - what more could you ask of an assembler? Except maybe an editor package.

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PER is a way to learn
PER is a way to learn
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PER is a way to learn

Learn programming
C is a way to learn
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Learn programming
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**VIC:
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NEED TO
KNOW**
VIC 20 User Guide by John
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There are dozens of books about the Vic. But this one is the best all-rounder we've come across. Not cheap, maybe, but you get a beefy large format paperback of 337 pages, packed with information and beautifully presented with professional illustrations and clear listings.

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Commodore 64 – getting the most from it by Tim Onosko, published by Prentice-Hall.

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If you want to have to use only one book to get on top of your 64, buy this one!

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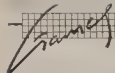
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The 64 ought to be an excellent computer for games - and fortunately some suppliers are indeed taking advantage of that. Others aren't. Here's this month's crop of reviews.

How do we assess games? Basically we play them - which may sound obvious, except that all the reviewers have seen so many games that they can apply a bit of comparative experience to the evaluation.

We rate games out of five for each of four criteria. **Presentation** means how well the thing is packaged and how good it looks on the screen; **dull graphics** and poor sound get marked down here. **Skill level** refers to how much skill (of whatever kind) is required to play the game - so if pure chance is involved, the game gets a low mark. (But don't dismiss it on that: some 'chance' games are great fun.) **Interest** is an answer to how well the game did at maintaining the reviewer's interest in it. And **Value for Money** is obvious enough: it's our overall conclusion about how it compares with other games and whether we'd buy it ourselves.

BANANA DRAMA

Keyboard only
Price £7.95

Ever fancied yourself as budding dictator? Well, this game (I am reluctant to call it a simulation) from Visions will allow you to give vent to your power lust as president of Ananaba, a banana republic (geddit?).

Each month, you get a report on the state of your officers - and you have the option of paying the State security Organisation (£5.0.) \$1,000 for a full state-of-the-state report if you can afford their services, and their loyalty to you is sufficiently high! This report gives you power and popularity, and the power and loyalty of the all important sectors (ie SBO, Subvervians, USSR, Industrialists, Plantation workers, etc.). Next there may be a news report (like 'Toralbana has invaded'), followed by a request from one of the above groups - such as 'The Subvervians ask you to sack all military chiefs.' You may pay the SBO to give an analysis of the pros and cons of the decision, before deciding whether or not to grant the request.

Then comes the Menu of 'Presidential Options' ranging from 'Look after Number 1' to 'Pleasant foreign powers'. All options open up to a sub-menu of six options: the former consisting of such things as investing in a Swiss bank account, the latter in buying American computers or Russian cannons.

The object, of course, is to stay in power as long as you can, before being assassinated or causing a rebellion (now you know why you invested in the Swiss bank account and bought the private submarine!).

In all, a good game which will keep the whole family amused. It

gives a score at the end of your term of office, which can serve as a yardstick for competition. **DW**

Visions Software

Presentation:	■■■■
Skill level:	■■■■■
Interest:	■■■■■
Value for money:	■■■■■



CAVELON

Joystick only
Price £6.90

Cavelon is a game with an original Camelot theme: enter the castle stronghold to rescue the unfortunate Guinevere, battling with six levels of knights and archers as you make your way to the top of the castle, where the fair damsel is held captive.

Each level is a maze of passages, in which are scattered sections of the doot, as well as various pieces of armour. You have to gather all the pieces of doot and make your way to the exit to advance to the next level. Bonus points are awarded for gathering armour.

You fire cannon-ball type missiles at similarly armed knights and archers, and you can also use a 'zap' if you find yourself in a tight spot, which will render all enemies helpless for a few seconds. Watch out, though: your supply of zaps is limited, but you are awarded an

extra zap if you come across Excalibur on your travels.

After battling through six levels, the 'Black Wizard' (sic) must be defeated before you get to rescue Guinevere. Six levels have so far proved a little too much for me, so I haven't yet met up with the aforementioned...

In all, an enjoyable little joint, with graphics and sound up to par. The game features 'Injection Loading', with Spectrum-style flashing screen during loading (the reason shades me). **DW**

Ocean

Presentation:	■■■■
Skill level:	■■■■■
Interest:	■■■■■
Value for money:	■■■■■

CUTHBERT GOES WALKABOUT

Joystick or keyboard
Price £6.00

So that dashing, debonair, swash-buckling charmer Cuthbert is now appearing on the 64 in C-G-W, he must run about on a grid of squares, touching each square's corners in order to make it light up, while avoiding the Moroccan Invaders, which chase him. In Q-Sant fashion, when all the squares have been lit up, the player advances to



the next level - but not before Cuthbert does a lap of honour, dancing the Can-can, would you believe?

Controlling of Cuthbert can be quite a demanding task, as Moroccans close in from all sides. You can jump over them, but be careful: you can't change direction while you are in mid-leap! If you aren't quick enough about completing a sheet, the chief Moroccan appears - a deadly foe, who has been known to cheat...unthinkable!

The cassette-tape instructions are clear, but state a six-minute loading time. My review copy loaded in a fraction under two minutes. Possibly, Microdeal discovered the joys of Turbo Load too late to change their play cards. Be rest assured, they have discovered it. **DW**

Microdeal

Presentation:	■■■■
Skill level:	■■■■■
Interest:	■■■■■
Value for money:	■■■■■

FIRE ANT

Joystick only
Price £7.95

This is a hybrid arcade/adventure game. The joystick directly moves one of the characters; that makes it arcade. The other half of the formula arises from the necessity to collect objects and decipher their possible uses, learning by experience, game by game.

Liberties have been taken with zoological facts: scorpions have adopted social habits and formed a colony. They have seen fit to abduct a queen ant. And as busybody in chief you have undertaken to puzzle your way through eight screens, full of burrows and chambers to affect a rescue. You will draw on skill, intuition and pure guess work as you grab the goodies, evade the patrolling archers and evaluate just how to build bridges, hole holes and whatever other unpardonable is in vogue in the latter screens. Always, you start at the top of each sector and you eventually make for



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the exit at the bottom in order to break through to the next stage.

The fabric of the nests is textured with oodles of colour; no need to make allowances for the computer either as they certainly look the part. Competent sound effects with very good 'specials' such as pneumatic drills, framing electricity and crunching rockfalls which all add to the superb presentation.

I could have done with more lives if eventually became frustrating returning to screen one, for once the problems of a particular stage have been solved, a great deal of interest lades leaving you with just a very ordinary game. The fascination lies in the problem solving coupled to the action, the two cannot be divorced. Still, a very impressive game. LS

Mogul

Presentation:	*****
Skill level:	*****
Interest:	*****
Value for money:	*****

JAMMIN

Jeopardy on keyboard
Price £5.95

A completely novel, superbly implemented and highly colourful program revolving around the music business, most strongly featuring full-blown rock 'n' roll and guaranteed to give your SID chip a beating.

The basic idea is to travel around a conveyor-belt scene-mass-comic-Ludo-board in order to receive four musical instruments and return them to a central flashing light. You have to match up colours before hopping on or off the track. Just note, instrument stealers and (worse of all) dischords all hamper

your smooth progress towards the next screen, where the going gets tougher.

Not only is it interactive music all the way (and I don't mean just a soundtrack!) but innovative visual effects are thrown in for good measure. Excellent options boards make for ease of use in a most refreshing game.

It is my solemn duty, however, to advise against the purchase of this tape if it is Ivor Novello only for you. Be really nasty; show it to a friend who decided not to buy a 64! Taskset LS

Presentation:	*****
Skill level:	*****
Interest:	*****
Value for money:	*****

MOON BUGGY

Jeopardy only
Price £7.95

This is the second version of the genre I have seen to date in Troopa Truck there is a progression of hazards; in this opus they arrive in a random fashion. You are never free from the UFO's aerial bombardment as you guide your buggy over the rugged lunar surface, unless may tumble towards you at any time leaving off shells as they approach, and mine layers have evidently been cast. Boulderers need smashing or purging over, as do the various craters.

It's very much a matter of holding on by the seat of your pants, relying on reflex reactions - no time for cogitation, no room for error. Get your priorities right, co-ordinate evasive leaping with loosing off salvos from the two guns.

The foreground scrolls faster than the background, adding the impression of moving in a jagged mountainous terrain. Score enough points and the colour scheme changes from two shades of green to yellow and purple. The sound effects are entirely commensurate with the graphical representations, the most frequent noise usually being that of your huggy dinkety. Real and effective visual displays, as you'd expect from Amirog, but the game doesn't pander to your ego, success has to be earned. Set there are plenty of cover versions to come.

All Amirog 64 games now feature Turbo' quick load, can't be had. Amirog LS

Presentation:	*****
Skill level:	*****
Interest:	*****
Value for money:	*****



RENAISSANCE
Joystick or keyboard
Price £8.95

This is the ancient(?) game of Otello or Reversi - actually it's a more century old. Played by humans, winning lines are easily overlooked, so this is one strategy game which gains somewhat from being subjected to the computer's scrutiny.

There are eight levels of play (the last being for Smart Alecks only) with ever-deeper analysis by the micro of each move - and ascending difficulty and complexity. All the normal strategy-game functions are provided - things like

HELP, TAKE BACK MOVE AND SET UP. Full instructions are provided on the insert; and the whole package is markedly superior to 'type-it-yourself' versions.

Nit-picking time: why not allow a choice of counter colours instead of just black and white? But for the acid test - well, I've bought it myself. **LS**

Audiovisual

Presentation: ■■■■
Skill level: ■■■■
Interest: ■■■■
Value for money: ■■■■

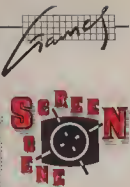
SLURPY
Joystick only
Price £7.95

Setting out on a foraging expedition in your local 'pick-your-own-creaky-creakies' cavern, you discover that it is impossible to move on to the next chamber until all the glow bugs have been sucked. You are equipped with an elephant's trunk as a vital part of your



anatomy. This acts like a vacuum, sucking up everything within range of its visible vortex. The blue glow bugs are ok, but should they turn red they must be spat out immediately, but brown is fine as this gives temporary immunity against attack from the indigenous nasties.

Some of these said creatures, big bugs and birds, hatch from the eggs on the floor, while spiders drop in, creepers perform as their name suggests and the odd snake will slither after you. Unlike your staple diet, these creatures are lethal to the touch and should only be approached behind the cover of your vortex, even then they should be immediately repurgated if they turn red. There are also some mega-loathsome beings which are totally taboo along with the



sometimes invisible phantom. If you make a meal of slurping your food an earthquake may catch you short, sending down a shower of stalactites.

All the necessary, uncomplained info is contained in a special instruction screen, which is as it should be in my book. Fansires (drinking your tea from the saucer slurping sounds and whistling winds add to the enjoyment; no jobs at the graphics called for either. Love it. **LS**

Creative Sparks

Presentation: ■■■■
Skill level: ■■■■
Interest: ■■■■
Value for money: ■■■■

Caption contest



What's the men with the burnt-out case telling the somersee?

Commodore User CU sweatshirts to the ten best answers received before 1 December.

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All about wedges – the program listing

by Chris Preston

Chris Preston's article on Wedges in the **June** issue of **Commodore User** certainly did generate a lot of interest. Trouble is, we found out the hard way: lots of distraught and irate readers phoned us about the absence of the program listing described in the article.

With ruddy faces and abject apologies, here (at long last) is the required program. You'll need to refer back to the article itself for the explanation. Oh, and one more thing, the '£' signs in the listing should be typed in as '\$' signs.

```

0001      0000      ;wedge program
0002      0000      ;*****
0003      0000
0004      0000
0005      0000      ;v=Peison 1.1
0006      0000
0007      0000
0008      0000
0009      0000      ;date 10h 8h
0010      0000
0011      0000
0012      +000      ;mC=000
0013      4c ac 40 -0000 start ;mp entry
0014      4003
0015      4003
0016      4003
0017      4003
0018      4003      ;zero page declaration area
0019      4003      ;*****
0020      4003 index =014      ;string pointer for print
0021      4003 hextop =23      ;top of basic memory
0022      4003 t typ =0      ;pointer to basic 1
0023      4003 tmp0 =£0      ;temporary pointer
0024      4003
0025      4003
0026      0000
0027      4003      ;row subroutine definition area
0028      4003      ;*****
0029      4003
0030      4003 chrget =075      ;get character from basic fr 1
0031      4003 chrget =279      ;get last character again
0032      4003 lstrng =£0444      ;basic command level
0033      4003 new =£0444      ;define new command
0034      4003 chrret =£0390      ;end of original hext in 1
0035      4003 wrt =£FFd3      ;output character to screen
0036      4003
0037      4003      ;address definition area
0038      4003      ;*****
0039      4003
0040      4003 atcl =-£100      ;start of 2502 stack area
0041      4003 parse =£248c      ;return address from par 1
0042      4003 orec =£274c      ;return address from same routine
0043      4003 it =£0442      ;return str 1 from 1 routine
0044      4003
0045      4003      ;message definition area
0046      4003      ;*****
0047      57 40 40 4003 1=01 ;set wedge entry point
0048      47 40 36
0049      41 43 54
0050      49 50 41
0051      54 45 44
0052      74
0053      00 4003      ;byte id
0054      54 46 45 4014      ;text "the following notes"
0055      50 46 47
0056      4c 4c 4f
0057      37 49 4e
0058      43 50 45
0059      51 54 52
0060      41
0061      0050 00 4027      ;byte 1d

```

Prolog

```

0051 41 4F 4D 4025      .text "commands have been"
      40 41 4A
      44 51 20
      48 41 5a
      4C 20 42
      45 45 4e

0052 0d                .byte 0d
0053 41 44 44 4030      .text "added:"
      45 44 3a

0054 0d                .byte 0d
0055 0d                .byte 0d
0056 48 45 4c 4043      .text "hello"
      4c 41

0057 00                .byte 0
0058                    4048
0059                    4049
0060 0d                .byte 0d
0061 48 45 4c 404a      .text "hello john! how are you?"
      4c 4f 20
      4a 4f 48
      4e 21 a0
      48 4f 57
      20 41 52
      45 20 59
      4f 55 3f

0062 0d                .byte 0d
0063 00                .byte 0
0064                    4064
0065                    4064
0066                    4064      ;command table
0067                    4064      ;*****
0068                    4064
0069 48 45 4c 406a      .text "hello"
      4c c1

0070 36 41 4069         .word hello-1
0071 00                .byte 0
0072                    406c
0073                    406c
0074                    406c
0075                    406c      ;main program area
0076                    406c      ;*****
0077                    406c
0078                    406c
0079 a9 40 406c         .word 0
      .word 0

0080 25 35 406e         .word 0
0081 a9 00 4070         .word 0
0082 35 17 4072         .word 0
0083 20 44 c6 4074         .word 0
0084 a9 4c 4077         .word 0
0085 35 7c 4079         .word 0
0086 a9 5d 407b         .word 0
0087 25 7d 407d         .word 0
0088 a9 40 407f         .word 0
0089 65 7e 4081         .word 0
0090 a9 03 4083         .word 0
0091 a0 40 4085         .word 0
0092 20 24 41 4087         .word 0
0093 4c 44 c6 408a         .word 0
0094                    408d
0095                    408d
0096                    408d
0097                    408d

;this is the command decod. swct...
; of the program

0098                    408d
0099                    408d
0100 48 408d         .word 0
0101 8a 408e         .word 0
0102 43 408f         .word 0
0103 98 4090         .word 0
0104 45 4091         .word 0
0105 ba 4092         .word 0
0106 bd 04 01 4095         .word 0
0107 a8 4096         .word 0
0108 bd 05 01 4097         .word 0
0109 c0 42 409a         .word 0

0110 00 04 409c         .word 0
0111 c9 c9 409e         .word 0
0112 10 10 40a0         .word 0
0113 c0 w6 40a1         .word 0
0114 00 04 40a4         .word 0
0115 c9 c7 40a6         .word 0

```

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Election Night Special for Vic 20 +19K	£4.99
or any CBM 64	£4.99
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Calco Software

LAKESIDE HOUSE, KINGSTON HILL, SURREY, KT2 701, TEL 01-546-7256

Assembly

```

0116 f0 08 40a5      beq decd6
0117 c0 0c 40a6      cpy R:parse      ;executing a direct statement?
0118 d0 2c 40a7      bne return
0119 c9 c4 40a8      cpy R:parse
0120 d0 28 40a9      bne return
0121 e9 64 40b2      decd6      lda R:contab      ;set tap0 to point to command table
0122 85 a7 40b4      sta tap0
0123 a9 40 40b6      lda R:contab
0124 25 a8 40b8      sta tap0+1
0125 e2 00 40ba      ld R0
0126 a0 00 40bc      decd7      ldy R0
0127 a1 a7 40be      derd12      lda (tap0,x)      ;get character from command table
0128 51 7a 40c0      eor (intptr),y      ;compare with character in basic l
                                ;?
0129 f0 3f 40c2      beq decd1
0130 c9 30 40c4      cpy R150
0131 f0 21 40c6      beq decd2      ;test for abbreviated command
0132 20 1a 41      decd3      jsr fendcm
0133 18 40cb      clc      ;increment tap0 to skip over routine
                                ; address
0134 e5 a7 40cc      lda tap0
0135 a7 03 40ce      adc R1
0136 25 a7 40d0      sta tap0
0137 90 02 40d2      bcc decd5
0138 e6 a0 40d4      inc tap0+1
0139 a1 a7 40d6      decd5      lda (tap0,x)      ;test for the end of the command l
                                ;ble
0140 d0 e2 40d8      bne decd7
0141 68 40da      return      ;restore registers
0142 e8 40db      tay      ;note that all the command routines
                                ; must
                                ; jump here at the end
0143 68 40dc      pla
0144 2a 40dd      lar
0145 68 40de      pla
0146 c9 20 40df      cpy R:70
0147 d0 03 40e1      bne decd8      ;was the character a space?
0148 4c 73 00 40e3      jsr chrget
0149 4c 90 e3 40e5      decd3      ;get next character
0150 a1 a7 40e9      decd2      lda (tap0,x)      ;jump to end of charget in non
0151 10 1d 40eb      bpl decd9      ;reached the end of the command ?
0152 38 40ed      decd13      sec      ;update intptr to point to end of c
                                ; command
0153 98 40ee      lya
0154 65 7a 40ef      adc intptr
0155 83 7a 40f1      sta intptr
0156 90 02 40f3      bcc decd10
0157 e8 7b 40f5      inc intptr+1
0158 a0 01 40f7      ldy R1      ;jump to routine to handle command
0159 01 a7 40f9      lda (tap0),y
0160 2a 40fb      lar
0161 40fc      eor
0162 c8 40fd      iny
0163 01 a7 40ff      lda (tap0),y
0164 e8 40ff      pha
0165 3a 4100      lxm
0166 48 4101      pha
0167 60 4102      rts
0168 4103
0169 c8 4103      decd1      iny
0170 20 13 41      4104      jsr incptr
0171 4c be 40 4107      jmp decd12
0172 410a
0173 c0 01 410a      decd9      cpy R1
0174 90 cc 410c      bcc return      ;don't allow abbreviated commands o
0175 20 1a 41      410e      jsr fendcm
0176 30 da 4111      bml decd13
0177 4113
0178 4113
0179 4113
0180 4113
0181 4113      ;COMMON Subroutine area
0182 4113      ;*****
0183 4113
0184 4113
0185 4113      ;incptr - increments tap0 by one
0186 4113      ; inputs : tap0
0187 4113      ; outputs : tap0
0188 4113
0189 4113      ; registers used : none
0190 4113      ; flags affected : a = 0
0191 4113      ; subroutines called : none
0192 4113
0193 e6 a7 4113      incptr      inc tap0

```

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

Program

Using the 64's Function Keys

— the program listing

by John Rampling

The blunders continue: last month, we didn't manage to publish the Basic program that accompanies John Rampling's article on defining your own Function keys for the 64. The culprits are now standing in a corner. Here is the omitted program, complete with yet another truckload of apologies to distraught readers.

But you'll need to refer back to the **August** edition of **Commodore User** for a complete explanation of what's going on. It's a good idea to type the program in using lower-case mode

```

10 REM *** KEY DEFINITION PROGRAM ***
20 REM *** JOHN RAMPLING 1984 ***
25
30 REM *** THE IMPORTANT LINES ***
31 REM *** OF THIS PROGRAM ARE ***
32 REM *** LINES 88 TO 438, YOU ***
33 REM *** CAN LEAVE OUT THE ***
34 REM *** REST TO KEEP IT SHORT ***
35
37 POKE$2201.7:POKE$3280.0:POKE$008
40 PRINT:GOTO 100
41 PRINT "CL.E. KEYS F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, F28, F29, F30, F31, F32, F33, F34, F35, F36, F37, F38, F39, F40, F41, F42, F43, F44, F45, F46, F47, F48, F49, F50, F51, F52, F53, F54, F55, F56, F57, F58, F59, F60, F61, F62, F63, F64, F65, F66, F67, F68, F69, F70, F71, F72, F73, F74, F75, F76, F77, F78, F79, F80, F81, F82, F83, F84, F85, F86, F87, F88, F89, F90, F91, F92, F93, F94, F95, F96, F97, F98, F99, F100, F101, F102, F103, F104, F105, F106, F107, F108, F109, F110, F111, F112, F113, F114, F115, F116, F117, F118, F119, F120, F121, F122, F123, F124, F125, F126, F127, F128, F129, F130, F131, F132, F133, F134, F135, F136, F137, F138, F139, F140, F141, F142, F143, F144, F145, F146, F147, F148, F149, F150, F151, F152, F153, F154, F155, F156, F157, F158, F159, F160, F161, F162, F163, F164, F165, F166, F167, F168, F169, F170, F171, F172, F173, F174, F175, F176, F177, F178, F179, F180, F181, F182, F183, F184, 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42 PRINT "FUNCTION KEY CHOSEN THEN PRESS THE"
43 PRINT "KEY."
44 PRINT "1) DEFINE A SHIFTED KEY (F2, F4, F6"
45 PRINT "OR F8), USE THE "OMNIDORE L000 KEY,"
46 PRINT "THE PROGRAM WILL ACCEPT DEFINITIONS"
47 PRINT "OF UP TO 64 CHARACTERS IN LENGTH"
48 PRINT "USE THE L+2 SYMBOL TO DENOTE "L+2"
49 PRINT "CHOOSE THE MEMORY LOCATION IN WHICH"
50 PRINT "THE MAIN MACHINE CODE PROGRAM IS TO"
51 PRINT "BE STORED PRESS THE SPACE BAR"
52 PRINT "TO VIEW THE OPTIONS,..."
53
55
56 GET A$:IF A$="C" THEN GOTO 100
57
58 POKE$2201.7:POKE$3280.0:POKE$008
59
60 PRINT "SELECT FROM THE FOLLOWING -"
61 PRINT "1) TOP OF 4" BUFFER COMMENCING"
62 PRINT "AT MEMORY LOCATION $=000"
63 PRINT "2) START OF 4" BUFFER COMMENCING"
64 PRINT "AT MEMORY LOCATION $=000"
65 PRINT "3) TOP OF 16" BUFFER COMMENCING"
66 PRINT "AT MEMORY LOCATION $=000"
67 PRINT "4) START OF 16" BUFFER COMMENCING"
68 PRINT "AT MEMORY LOCATION $=000"
69 INPUT "SELECT 1 TO 4, IN"
70
71 GOTO 100
72
73 ON GOTO21.210:213.214
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Take 5 for the 64

Commodore 64 Machine Code Master

David Lawrence, who wrote *The Working 64*, gets a credit, as co-author of *Commodore 64 Machine Code Master*. The purpose of this book is not to teach machine code as such, but to let the reader study machine code in a practical manner.

Like *The Working 64*, it's split into a large number of small modules, that makes entering the programs much easier. The section on creating new commands is well detailed - I only wish this book had been around two years ago when I was learning this hard way!

Few books are perfect, but about the only criticism I could find with this was the slightly awkward assembler syntax for indexed instructions. Instead of taking the instruction LDA \$FFFFX which is what the disassembler gives, the slightly different LDA \$FFFFX must be used. This is because reading the program from tape or disk would give an error if a comma was in the middle of the line.

If you have learnt or are learning machine code and want to become proficient, this book is a very good way to do so. And Sunshine is now selling the tools from this book on a cassette at \$14.95 to save you the effort of typing the programs in (though I feel you would probably learn more if you entered them). Conclusion? One of my favourites.

The Book:

The Authors:

The Publisher:

The Price:

The Reviewer:

The Conclusion:

Commodore 64 Machine Code Master

David Lawrence and Mark England

Sunshine Books

£8.95

David Bolton

Excellent

101 Programming Tricks For Your Vic and 64

In brief, I was very disappointed with this book. From the cover I thought it would have been full of dodges and clever programming goodies which would make life easy or show off nice features of the machines. Instead it consists of 101 short programs in Basic each demonstrating a simple task like calculating averages, rolling dice or currency conversion.

The level of programming is very simple, arrays, for instance, are never featured, and hardly any attempt is made to show off any special features of the computer like user-defined characters. But what really annoyed me was the number of programs which had POKes to the sound generators ... but which were for the Vic. There were 16 of them, and no mention was made of the fact that they'd run only on the Vic. Any 64 owner would get very frustrated at these not working, and there is a chance that the 64 would crash in some cases.

If you've just acquired a Vic and are learning Basic this book might be of some benefit: I could not honestly recommend it to any 64 owners.

The Book:

The Author:

The Publisher:

Price:

The Reviewer:

The Conclusion:

101 Programming Tricks For Your Vic and 64

Howard Adler

n/a

n/a

David Bolton

Disappointing - ok maybe for Vic owners

Commodore 64 Exposed

Commodore 64 Exposed might sound like something from the tabloid press, but really it's a 64 equivalent of *Vic Revealed* (and an alternative to the forthcoming follow-up *64 Revealed* from Nick Humphreys). This book is aimed at the programmer who wishes to progress beyond simple programs, or perhaps for the experienced programmer from another machine who wishes to become quickly acquainted with the 64.

So this one and *Using the 64* are very alike in subject matter, but they differ greatly in presentation.

Bruce Bayley moves along at a fast pace, covering binary and hexadecimal by the end of Chapter One and including machine code routines by Chapter Three. Sound is covered in Chapter Four and again machine code is used to show special effects.

Machine code is not introduced as a separate topic until Chapter Six - when the going gets a little heavy. Thankfully there are always many examples (which usually include a Basic loader and assembly source code); I particularly liked the program which displayed 16 sprites at once on the screen.

The last Chapter looks at peripherals like paddles, joysticks, disks and printers, and the whole thing is rounded off with some useful technical appendices.

Taken by itself this is a very good aid for anyone who would find the *Programmer's Reference Guide* a little daunting and needs a little assistance. The use of machine code to show off the 64's capabilities is particularly noteworthy.

The Book:

The Author:

The Publisher:

Price:

The Reviewer:

The Conclusion:

Commodore 64 Exposed

Bruce Bayley

Melbourne House

£8.95

David Bolton

Good alternative to the *Programmer's Reference Guide*.

101 Programming Tips & Tricks for the VIC-20 and Commodore 64

COMMODORE 64 EXPOSED

64 books reviewed

by David Bolton

Using the 64

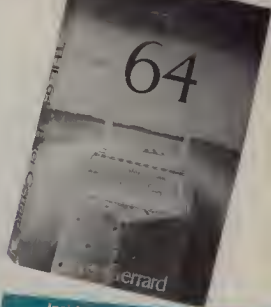
Using the 64 was written by Pete Gerrard, former editor of a rival magazine (but I'll not hold that against him). And it is a very readable book, which starts off for complete beginners and finishes at quite an advanced level. He writes in a friendly manner, though this style means he sometimes glosses over topics with a touch less detail than is really required.

A very good feature of the book is the use of substitute codes in all of the Basic programs: (REV OFF) is much easier to pick up than the usual reverse bar. I only wish all magazines and books would standardise on substitute codes.

This is a book which moves into machine code at an early level (Chapter three), and includes a listing of EXTRAMON in one of the appendices so that the diligent reader can try out all of the examples. There are many people I know who have mastered Basic to a competent level and would like to learn machine code. Using the 64 is a good book for that, but I would like to see some of the sections expanded upon with more explanations. It's not cheap and it's not the only book covering this area; but if you like a great deal of useful information in a large volume then save up and buy it. There is a lot that I have not seen printed anywhere else, for instance listings of Basic statements and a full list of Basic and Kernal ROM addresses (three pages).

I would have no hesitation in claiming that this is one of the better 64 books around - were it not for the silly mistakes which pop up now and then. Too much haste in bringing out this book has led to too many mistakes slipping past the proof reader.

Most of the mistakes are a bit silly, like a utility program which lets you examine the status of both the IEEE and the disk processor in a 1941 disk unit - Commodore would be very interested to know this as they only build one processor into 1541s! I trust that the second edition will have all the mistakes corrected. Nevertheless, all in all it's a very good book.



Inside the Commodore 64

Inside the Commodore 64 is for the machine code addict, as it consists of a complete disassembly of the 64's Basic and Kernal ROMs.

If you've completed *Machine Code Master* and want to understand more how the 64 functions, this book is probably the best way. Although *Using the 64* has a list of ROM entry points, inside the 64 is much better documented (almost each line); and it is complete within itself, too.

The disassembly is in two parts - the Basic and the Kernal. Each is fully cross-referenced, so that all references say to location \$7A can be identified. All subroutines, branches and jumps are also cross-referenced; tracing program flow is that much easier like this, and it lets you find out where subroutines are called from - no mean task in 16K of machine code.

Incidentally, through reading this book I think I've actually found a bug in Commodore's programming. The OPEN and CLOSE file statements call the same subroutine to evaluate parameters; so OPEN 1,3,8, "FRED" and CLOSE 1,3,8, "FRED" will both work. But CLOSE 1,3,3,4 gives an error and CLOSE 1,2,3 only closes channel 1, not 1, 2 and 3.

My complaints about this book are that it is badly bound and very expensive (it's a US import, available in the UK at just under £13) - my own copy has been extensively thumbed and several pages are now loose. Nevertheless, if you are into serious 64 machine code programming, it is a must!

The Book:
The Author:
The Publisher:
The Price:
The Reviewer:
The Conclusion:

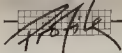
Using the 64
Pete Gerrard
Dockworth
£9.95
David Bolton
Good but marred by small mistakes

What's really
inside the
Commodore 64 is

What's really inside the Commodore 64 is

The Book:
The Author:
The Publisher:
The Price:
The Reviewer:
The Conclusion:

Inside the Commodore 64
Milton Rathbun
Sunshine Books
£12.95
David Bolton
A must for serious machine code programmers



Bubbling over with software

Taking a look at Bubble Bus

by Bohdan Buciak



Bubble Bus has always tried to be different from the mainstream of games software houses. Instead of projecting an image of mystery and fantasy – the standard fare of most games producers – it's managing to succeed by emphasising an element of childish fun. In fact, you won't find any mouldy outer-space zapping games in the whole range it's produced so far. So what kind of people are Bubble Bus and are they as effervescent as their name suggests? Bohdan Buciak popped down to Kent to see them.

Games software houses turn up in the unlikelyst places, and Bubble Bus is no exception. It's rather proud of living in a barn – albeit a lovingly restored and converted one – in the sleepy Kentish town of Tonbridge. From there it has managed to produce a range of software which amounts to four Vic utility programs, conversions of them plus six games for the 64.

That's not a particularly large range considering that the company's been involved in the industry almost from the beginning. Most other software houses produce new games almost as quickly as they spend their profits – with the result that only a few become classics and the rest are, at best, mediocre.

"We've always gone for quality and not quantity", asserts Mark Meakings, one of Bubble Bus's two directors. "We realise that everything we do must enhance the company's reputation." And the conspicuous absence of a Space Invaders clone? "It's a conscious attempt to be different

We appreciate that space games sell; the problem is that not enough people put sufficient thought into originality and being different."

That sounds like a sensible and professional approach, qualities Meakings has probably acquired from a business background before entering the games market. He set up Computer Room about five years ago as a business computer dealership, that company, which still exists, eventually spawned Bubble Bus. Business and marketing skills may be prerequisites for running a company, quite a few games producers sadly lack either.

Computer Room sold mainly Commodore business systems and Apple computers. But Meakings soon realised that this wasn't going to make him the sort of money he was expecting. "At that time, a lot of people were getting on the bandwagon and a great deal of price-cutting was going on. So I decided to get involved in software instead."

Two-man band

That's where Sandy Marchant came in, now Bubble Bus's second director, with the unlikely distinction of having been a programmer and analyst with the Ministry of Defence.

He didn't join Computer Room to produce games; that took considerably more time to hatch. The Meakings and Marchant plan was to produce business software, so Sandy sat down and wrote a production control system plus a package for newsgroups. Both still appear in Commodore's Approved Product Catalogue for the Pet.

Then the games market really opened up with the introduction of the Vic. Consequently, the Meakings-Marchant duo couldn't help noticing that people were producing and selling lots of games and driving bigger cars. Still, Mark Meakings was haunted by a desire not to flow with the current; he decided to approach the market by a side-door.

"We thought we could do something different for the Vic by writing utilities." Actually, those utilities are still available and continue to sell steadily. There's a basic word processor, a postage and label printer and a unique program called Advertiser, which runs your screen into a moving message display. (All have now been converted for the 64 too.)

Sales of utilities didn't produce the bags of money Meakings had envisaged, let alone the volumes of notes being gathered in by dedicated software houses. "The utilities did moderately well but



Handwritten signature: R. Pike

we weren't bowled over by their success. We were selling a few, the games people were selling in thousands. So we decided we had to get into games."

Just to add to the urgency of doing that, the 64 appeared on the scene. With its new potential, Meakings just couldn't resist the challenge. "We've traditionally been associated with Commodore and we had a lot of potentially useful contacts with Commodore dealers. In any case we didn't have time to check out other machines and it seemed obvious that the 64 would supplant the Vic."

Along with the company's new direction came a new name - "we needed it for the sake of credibility." What Meakings is saying is that selling both expensive technical software and games under the same name is a particularly uncomfortable mix one invariably undermines the other.

So everyone sat down and put their brains together to think up an appropriate name. After three hours somebody had come up with 'Bubble Software' - and then one brilliant individual mentioned 'bus'. "There was no logical reason for the choice," recalls Meakings, "except that it allowed us to be different from everybody else." That desire to be unique, no doubt. The logo design seems to have appeared in an equally casual manner. "We told someone from a graphics studio round the corner. He designed the logo in his bathtub on a Sunday morning."

Strange days

With the new image and new direction came a new programmer, Nick Strange, who had already worked with Sandy Marchant at the MoD. He got the job of writing the first game and a fairly strict brief of what that game should be. "We wanted to get off to a good start," recalls Meakings. "It had to be a game that wouldn't take quickly and would have a long shelf-life probably something spooky."

So Strange sat down for four months and wrote *Hunter*, a good simulation of pool. That has now become Bubble Bus's top title, selling about 30,000 copies to date, quite an achievement for Strange, since he'd never written a game before.

With that success under his belt he applied himself to a more difficult project, though still with the idea of simulating an already well-known and popular game

He spent unnumbered hours on the table football game the company had installed in the loft and eventually came up with *Kick Off*, an on-screen version of it.

Since then, two new programmers have arrived. The first was Terry Owen, a Falklands veteran who's responsible for the newish *Flying Feathers*. The game involves a gamekeeper shooting eagles to stop them stealing fish, a scenario that has incurred the wrath of the Royal Society for Protection of Birds who've requested that it be withdrawn from the market. Meakings won't do that: "The idea is fantasy, a bit

software houses who won't let you through the door unless you've already written the substantial portion of a block-buster."

But Meakings is quick to dispel the impression that he isn't amenable to wild-eyed programmers who hot-foot it to his door - and many other doors no doubt - for an opportunity to display their wares.

The 16-year old Richard Clarke is a prime example. "He walked in off the street with a game he'd written at home on the Vic. It was technically very good, but it was yet another variation of Pacman. So we bought him a complete 64 system and gave

Bus range were not written in-house. Both *Exterminator* and *Widow's Revenge* are licensed from an American software house. And *Meakings* got hold of them through a dubious and tortuous route. "We got them from a guy who's notorious in the industry as a parasite and a crook. We knew the games had been pirated so we found out which software house had written them and came to an arrangement."

That brings us to the sensitive subject of piracy. Meakings recalls an occasion when *Kick Off* was suspiciously high in one of the numerous software charts at a time when Bubble Bus was selling hardly any copies.

Still, he is loathe to bust accusations and meaningless figures around (unlike many in the business) because he realises that nobody has yet fathomed out how widespread copying has become. So his approach has been practical.

"We feel it's necessary to fight the pirates collectively. So we've joined the Guild of Software Houses, and we contribute to its legal fund to authorise solicitors to press charges against any pirates we find. It's not possible to pursue it on your own."

In any case, Meakings may have a solution of his own.



of fun. No malice was intended towards animals" just as well there's no Flak from the Aethenas Society for the protection of alien space-ships.

Like Bubble Bus's other programmers, Terry Owen had no previous experience of writing games, he'd merely dabbled with a Spectrum. But that didn't seem to bother Meakings. "We were looking for someone with promise who we could train ourselves because we've already got very experienced software people." Makes a change from the kind of

him a project to do in his spare time."

Meakings emphasises spare time, because Richard was still at school then. That project turned out to be *Bumping Buggies*, the second of Bubble Bus's new games. Richard has just finished his O-levels and is all set for a fruitful career with Bubble Bus. Where would games houses be without their whizz-kid teenagers?

Ahoy mealy

Two of the games in the Bubble

Bubble Bus duplicates all its tapes in-house, which has obvious advantages, no long delays from duplicating companies are incurred, production can be stepped up easily for increased demand. But with its forthcoming introduction of Turbo loading, Bubble Bus has found that its own tape duplicators no longer work. So this should pretty well deter the home copier.

Still, if piracy exists on an organised basis (as is constantly claimed) that obstacle will not be unmountable.

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Taking the blame

Obviously Meakings holds strong opinions on piracy but he is perceptive enough not to apportion total blame for the industry's current plight to illegal copying. "Going to the wall has a lot to do with business and marketing strategies - companies consuming themselves to huge budgets and overheads. Too many people feel that whatever they do will be successful because they've been successful in the past. It's a case of people keeping their heads. There will always be a market for good quality games."

That's illustrated by the importance of good reviews in the computer press. "Reviews can have a big impact on sales." That's certainly true for Bubble Bus which has had consistently good reviews. And it means a lot to Meakings. "We know that we can sell on the strength of past products. A lot of our market comes from people who've bought us before."

Meakings has already witnessed examples of crazy marketing strategies; one of them concerns his own Hustler game. Bubble Bus sold it to American software house HesWare under licence to be marketed under the pseudonym name Minnesota Fat's Foot Challenge. There EMI Computer Software is now selling the complete HesWare range, including Minnesota Fat's, in this country... at £9.95. Hustler costs only £5.95.

When Meakings found out this was happening, to prevent people buying both copies he issued that a note should appear on the insert stating that the game was originally written by Bubble Bus and that it's also known as Hustler. The second condition hasn't been fulfilled, so Meakings won't be continuing with the deal.

The games go on

As piracy and stories of decreasing sales cannot deter



software houses from getting on with the day-to-day task of producing new games and selling as many as possible. Most of Bubble Bus's programmers are now working on new projects, plans include a 3D adventure game which Meakings reckons will be better than Valhalla.

All those will appear for the 64 which Meakings feels still has a great deal of life in it. "There's a lot more to be got out of the 64 - we haven't reached the limit yet", he asserts confidently.

New machines

A new departure will be work on the Spectrum and the upcoming clutch of MSX machines.

And on the subject of new machines, Commodore's latest 16 and Plus 4 models have just appeared - at long last. What are Meakings' views on those?

"We've not taken the final decision to program on these yet but we have our doubts. Those doubts are especially aimed at the 16. Lots of kids are looking at bigger machines than the 16 with its tiny 16K memory. We weren't impressed by it." There's a general consensus of opinion on that score.

Obviously the Plus 4 presents more of a challenge, but Meakings will probably wait until it's available in the shops before going any further with it. The reason for that being that Commodore gets marketing rights for any software written on pre-release development machines.

Generally, Meakings detects some confused thinking within Commodore as to the purposes of these new offerings. The 64 continue to sell very well and an obvious ploy would have been to decrease its price and to further strengthen its market lead. That probably won't be happening now.

Meanwhile, Bubble Bus is in the process of carving up the international market for itself. Meakings recognises that America "is a tough nut to crack", but Europe holds more potential and Bubble Bus has already started sailing there. "You can't be insular any more", asserts Meakings, "overseas sales used to be just extras; now it's becoming increasingly important". That's going to mean a lot more overseas business trips for him - maybe that's not a bad thing.

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A bigger Basic — Arrays and Dim

by Chris Preston

Few things seem to cause more problems to beginners in programming, while at the time being extremely useful, as the array. Yet it is in fact quite simple to understand, and shouldn't really be able to frighten anybody.

Before looking at arrays though, it will pay to very quickly go over the basis for ordinary variables (called *simple variables*). We can draw a picture of a simple variable as a little box with a name and a value.

NAME	VALUE
A	15

In this diagram, the value of the variable *A* is 15, so presumably when we have already given the variable a value, as in the following statement:

1450 A-19

Now let's look at a typical programming problem. We have a student in a class who has just taken an exam, and we want to store her marks in a variable **M**. We can use an **INPUT** statement to enter the value like this:

```
100 REM
100 INPUT "ENTER
MARKS": M
```

Now, one makes a very small number to have in a class. What if we have three students? We can have three variables, M1, M2 and M3 to hold the scores for the three examinees:

```

50 REM Program No.2
100 INPUT "MARKS FOR FIRST STUDENT"; M1
110 INPUT "MARKS FOR SECOND STUDENT"; M2
120 INPUT "MARKS FOR THIRD STUDENT"; M3

```

This looks quite reasonable. But what if we have a more realistic class with say 40 pupils? It is going to be a bit tedious typing in forty different INPUT statements, and just try to imagine the equation to calculate the average of the marks!

Of course the solution is simply to use an array, which is what we have been working around to all the time.

Let's stick to three schoolkids for the time being. Figure 2 is a diagram of an array $M()$ set up with three elements, $M(0)$, $M(1)$ and $M(2)$ so that it can hold the marks for three students; in fact

those marks are 67, 23 and 48.

NAME	VALUE
M(0)	67
M(1)	23
M(2)	43

This is really just the same as having three separate variables, M1, M2 and M3. The number inside the brackets is called the **array subscript**, and it identifies which element of the arrays we are going to use. So if we say

PRINT M(1)

- we are in fact selecting the second element of the array, and we will get the answer 23. Notice that we can use array references in exactly the same way as we do simple variables - in equations, PRINT statements, and so on. This means that we can rewrite Program No. 2 using our three array elements.

```
100 INPUT "MARKS FOR  
FIRST STUDENT"; M(0)  
110 INPUT "MARKS FOR  
SECOND STUDENT";  
M(1)  
120 INPUT "MARKS FOR  
THIRD STUDENT"; M(2)
```

If it bothers you to have the first element in an array numbered zero (yes, it is called the "zeroth" element!), then forget about it! If you need ten elements, there is no reason why you should not use an array with eleven elements numbered 0 to 10, and ignore the zeroth element.

Progress to date

So far we have got an array with three elements, $M[0]$, $M[1]$ and $M[2]$, and we have stressed the point that you can consider these in exactly the same way as three separate simple variables. So what is the advantage? Well the heart of the matter is that the subscript can be a variable, so we can say

Program No. 3

```

10 REM
20 FOR I = 0 TO 2
30 PRINT M(I)
40 NEXT

```

Now we can see the huge advantage of using arrays instead of simple variables in cases where we have a number of related values, such as the marks to the children in a class. This program is not going to get any larger if we increase the number of pupils from three to thirty – all we have to do is change line 20 to read:

20 FOR I=0 TO 29

Now let's modify Program no. 2 to input the marks for forty pupils.

```
10 REM Program No.4
100 FOR I=0 TO 39
110 PRINT "ENTER MARKS
    FOR PUPIL"; I; ""
120 INPUT M(I)
130 NEXT
```

Now if you try to run this program, you will find that when i=11 you get problems: Basic will give you a **BAD SUBSCRIPT ERROR**.

The problem is that you have not told Basic how big the array M() is, how many elements it has. In this case Basic assumes that eleven elements (0 to 10) will be enough, so it allocates sufficient space to the array for these elements. When you tried to access element M(11), Basic gave you the error. What we have to do is tell Basic how large the array is by using the DIM statement:

80 DIM M(30)

This tells Basic that we are going to use an array M(1), and the maximum subscript is going to be 39. It is in fact good practice always to declare your arrays at the start of the program. It saves space with small arrays (because they are only allocated three elements instead of 11) and it also helps you to remember how big the array is.

After adding line 90 the program will run; but it is a bit dry, asking for the marks for "pupil

15" and "pup16". How can we make it more human? By giving the pupils names. We can store the names in DATA statements at the end of the program, and read them into a string array:

```

100 REM Program No.5
110 DIM PS(39), M(39)
110 FOR I=0 TO 39: READ
PS(I): NEXT
120 FOR I=0 TO 39
130 PRINT "ENTER MARKS
FOR"; PS(I); ";";
140 INPUT M(I)
150 NEXT
200 FOR I=0 TO 39: T = T +
M(I): NEXT
210 AV = T/40
220 PRINT "THE AVERAGE
MARK FOR FORM 4A
IS"; AV
1000 DATA "RICHARD
ADAMS"; "PERCY
BLAKENEY";
"CLAUDIA
CARDINALE"
etc.

```

Quite a few things to look at here! Line 100 shows that we can dimension more than one array in one statement, and that we can have string arrays (we can also have integer arrays such as `R54()`; we will mention these later). In line 110 we read all the pupils' names into a string array `PS()`, so that the input prompts become a little bit more friendly:

ENTER MARKS FOR
HAROLD WILSON?

Lines 200 and 220 calculate and print the average mark.

Another DIMension

Now for an extra dimension: what if the headmaster, greatly impressed by our work with Form 4A, wants to extend the program to cover 4B, 4C and 4D? Do we have four arrays, one for each Form? No, there's a better way: we have one array with two dimensions.

```

10 REM Program No.9
100 DIM M(39,3)
110 FOR I = 0 TO 3 : FOR J
    = 0 TO 39

```

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```

120 READ P$(J): NEXT
    NEXT
130 FOR I = 0 TO 3: FOR J
    = 0 TO 35
140 PRINT "ENTER MARKS
FOR"; P$(J, I):
150 INPUT M(J, I): NEXT
    NEXT
    etc.

```

We can consider the two-dimensional array M(I,J) as four single-dimensional arrays of 40 elements each, or as a rectangular array, with the first subscript giving the row number and the second the column.

Read up that boy who scored 61

The trouble is that our head is too keen for words. Now he wants to include the Third and Fifth Forms as well. No problem: we add another dimension, whose value, 3, 4 or 5 tells us which year we are talking about.

```
100 DIM M(39,3,5)
```

We can consider this as a series of pages in a book each of which

has a rectangular array like Figure 3 drawn on it, in which case the third subscript becomes the page number. At this point, though, it is probably better to forget about drawing physical models of the array and just think of the three subscripts as being keys which select the right 'box'.

M (pupil, stream, year)

There is in fact no limit in Basic as to the number of dimensions. But multi-dimensional arrays eat up memory, so a practical limit is probably four.

M (pupil, stream, year, school)

How can we have a four-dimensional array without delving into science fiction? Well, as far as the Vic or the 64 are concerned, no matter how many arrays we have the elements are stored one after the other in memory - in a line, almost - and the machine calculates where any element is by a clever equation using the



Information in the DIM statement

Integer arrays

One last point which is well worth mentioning is the use of integer arrays. You may have heard it said that there is no point using integer variables because, contrary to what you might expect, they take up more memory and are slower. This is quite correct while some versions of Microsoft Basic do have true integer arithmetic, the Commodore Basic just converts any integer value to floating point before using it. That takes time, and the variables still take up seven bytes in the variable table, which means that all those % signs are just wasting bytes.

When it comes to arrays, however, you can get a large space saving (although you are still stuck with the speed penalty) by using integer arrays. DIM A (1000) takes approximately 5,000 bytes, DIM A% (1000) takes approximately 2,000 bytes. Quite a saving!

There are a few things which can go wrong when you are using arrays. If you dimension an array to have 15 elements.

```
DIM A(14)
```

- you cannot then say PRINT A(22). All that will happen is that you will get a BAD SUBSCRIPT ERROR.

Resizing arrays?

Also, once you have declared an array, you cannot change its size; there is no way to make it larger, or disappear altogether to release some space. If you try to dimension an array more than once you will get the message REDIM'D ARRAY.

This can also happen if you use an array and then try to declare it:

```
10 A(5) = 50
20 DIM A(30)
```

This is because at line 10 Basic dimensions A() itself, so line 20 just causes an error. You must dimension an array before using it.

One last error, which is much more difficult to spot, is forgetting to initialise one element of an array. For instance

```
10 FOR I = 0 TO 5: A(I) = 5: NEXT
1450 FOR I = 0 TO 5: A(I) = A(I) + 1: NEXT
```

Notice that the two FOR loops have different ranges? Another reason for dimensioning all arrays, so you know just how big they are.

Hopefully this article will have stripped some of the mystique from the business of using arrays. There really is nothing to it since you get the knack, and it is almost impossible to write any sort of real program without using them.

I	J			
	0	1	2	3
0	72	64	61	56
1	47	68	44	38
2	65	51	48	40
3	59	70	53	44
4	80	23	18	32
5	75	61	56	0

M (J,I)

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CBM64

SEPTEMBER

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1	(1)	Beach Head	US Gold	1	(1)	Flight Path 737	Anirog
2	(2)	Volhalla	Legend	2	(6)	Jet Pac	Ultimate
3	(5)	Arabian Nights	Interceptor	3	(2)	Choriat Race	Microentics
4	(9)	Encounter	Navagan	4	(-)	Areadia	Beau-Jelly
5	(7)	Cavalen	Ocean	5	(12)	Flight 015	Ferranti
6	(-)	Aztec Challenge	US Gold	6	(-)	Jack Pot	Mastertronic
7	(17)	Blogger	Alligata	7	(5)	Snoober	Visions
8	(4)	Leos	Alligata	8	(9)	Bonga	Anirog
9	(13)	Flight Path 737	Anirog	9	(-)	Tank Commander	Creative Sparks
10	(3)	Hulk	Adv. Int.	10	(10)	Spiders of Mars	Audiogenic
11	(8)	Solo Flight	US Gold	11	(4)	Duck Shoot	Mastertronic
12	(15)	House of Usher	Anirog	12	(-)	Lozer Zone	Llamesoft
13	(-)	Monic Miner	Soft Proj	13	(12)	Sub Commander	Creative Sparks
14	(12)	Sen of Blogger	Alligata	14	(-)	Scream	Anirog
15	(14)	Caverns of Khafka	Cosmi	15	(-)	Krazy Kong	Anirog
16	(11)	Sheep in Space	Llamesoft	16	(14)	Wiz and Princess	Melbourne
17	(10)	Chukkie Egg	A&F	17	(15)	Sub Hunt	Mastertronic
18	(-)	Twin Kingdom Valley	Bug Byte	18	(-)	Space Joust	Software Projects
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20	(-)	Alice in Videoland	Audiogenic	20	(-)	Punehy	Mr Micro

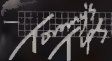
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TAMM'S TIPS

Tamm is Commodore User's resident know-all. Each month he burrows through a mountain of readers' mail and emerges with a handful of choice queries. The result, before you, is a wedge of priceless information and indispensable advice. There's even the odd useful tip as well.

Dear Tommy, Having recently entered the world of computers by purchasing a CEM 64 with 1541 Disk Drive, I have been somewhat annoyed (to put it mildly) by some of the errors I've come across.

First of all, as a regular reader of 'Input' magazine I enter most of their programs, but recently I entered a space station program and when I ran it the screen seemed to freeze. I tried RUN/STOP and then simultaneous RUN/STOP and RESTORE but nothing worked. The effect of the 'freeze' was that the cursor disappeared from the screen and only half the keyboard, i.e. every alternative letter would function.

Similarly, after programming Forbidden City from the book by Vince Ayres (which took 4 hours) I was surprised when, after about 5 minutes the keyboard locked up solid. No single key or combination of keys would free it.

As you can appreciate, in both cases I was unable to LIST the entries in order to check them.

Could you please advise on the causes and cure for this?

Furthermore, I have recurring problems editing programs already SAVED on disk. In order to learn more about structured programming I've put together a program which I frequently alter to use the result, but I find that although the initial SAVE command worked well, I cannot successfully SAVE any amended or alternative version. Can you help?

Without knowing what the programs are and what they are doing it is not possible to state what the cure is. What is most likely is the there is an error in the program (or your typing) which has caused the program to POKE an incorrect value or an incorrect address. The resulting 'crash' could well cause the effects you have mentioned. The moral of the tale is: always save a program to tape or disk before running it! One major problem you are going to have is that without a printer it is going to be

very difficult for you to debug the program on the screen. Screen debugging is fine for small programs, but one that takes four hours to type in must be fairly messy. See if you can find someone with a printer and ask them to dump out a listing: it's the only real way of sorting out those elusive bugs.

Your second problem could well be the infamous 'Replace' bug in the 1541 ROM. Basically, if you use the GEDDISMAN method of re-saving a file which is larger than the original, due to changes, then you will corrupt the disk because it overwrites parts of the disk that it shouldn't. The only way round this is to delete the old version first and then do a normal save command.

Dear Tommy, I write to seek your expertise on two counts. The first concerns a rather annoying bug which I find exists between my Vic-20 with 24K expansion, Commodore 1515 printer and the CEN cassette deck. I find that if I have saved a program on tape and subsequently I tried to list it on the printer I get an initial feed followed by a short pause (15-30 secs) then the cursor returns to the screen, flashing normally but on further action is forthcoming from the printer despite such encouragement. To add insult to injury any subsequent input to the Vic via the keyboard (including RUN/STOP and RESTORE) merely results in a cursor and a dead machine. A situation which I have only been able to recover using the ON/OFF switch. As this bug only prevents itself after using the tape deck I feel there must be a slow location that could be used to allow output to the printer subsequently. Your advice please.

The second problem I have involves the transfer of programs from the Vic-20 to the Commodore 64. Equipped with both computers a 1541 disk drive and a cassette deck is there any way to transfer programs to the 64 if they have been written for the Vic and stored on tape? If not is there

any other solution to the problem short of typing them in on the 64?

Rather a strange problem this I used an identical combination of hardware for some time without any such bug occurring. It sounds therefore as if either your Vic or printer might possibly be faulty. One way round the problem might be to press RUN/STOP/RESTORE before doing the print. If you find that the system still locks up, try switching the printer off; this sometimes releases the Vic from its apparent paralysis. In any event I suggest you contact your dealer especially if your Vic or your printer are still under guarantee.

Your second problem is a lot easier to solve. Load the programs into the Vic from the tapes and then save them on disk. The 64 will happily load the programs from disk, although you will still have to make software changes to the PEEKs and POKEs in the program before you can run them.

Dear Tommy, We have a Commodore 64, a Commodore 1541 and an Epson RX10.

What do we need to receive programs from the BBC Ceefax pages? Your assistance will be very much appreciated.

Basically, what you require is a Ceefax receiver with an interface for the 64. The problem is that I do not know anyone who is currently producing such a combination. Although there are computer programs which can be downloaded, these are only for those machines such as the BBC computer for which adapters have been produced; these even if you managed to get a hook-up I don't think you will gain much at present over a standard TV with teletext facilities built in. If you want a more interactive database network to link into why not take a look at Micromos 800 or Compuserf which give (as will give, for the latter) access to Prestel and are two-way communications, unlike Ceefax. Rumour has it that a CEM 64 interface is now available for Micromos 800. You can obtain further details by ringing 01-878 3134 for Micromos and 01-637 1385 for Compuserf.

Dear Tommy, I have an unexpanded Vic-20 and the following runs up the screen for about two minutes. Could you tell me what to do in this program as that, at the end of it, I can feel out from the computer how many times Nol appeared, how many times Nol appeared and so on up to No 50:

```
10 FOR J=1 TO 5000
20 S=INT(1+(50*(RND(0)))
30 PRINT S;
40 NEXT J
50 STOP
```

Keeping you can oblige

Your problem can be solved by storing the totals in an array; one element for each number. The following lines create the array and then store the numbers in the loop:

```
5 DIM T(50)
25 T(0)=T(5)+1
```

Although RUNNING a program will clear the array it is good practice to clear the array properly since not all machines do it automatically; the following line will ensure the all elements are set to zero before you start:

```
7 FOR A=1 TO 50:T(A)=0:
NEXT A
```

To print out the totals at the end the following code is needed:

```
42 PRINTFOR A=0 TO 10FOR
B=1 TO 50:TL=(A*2)+B
44 PRINT "<=RND>"; RIGHT(
STR$(TL),2); "<=BLA>";
TL);NEXT B
46 PRINT:NEXT A
```

This will print out the values in 17 rows of 3 columns so you can see it all on one screen without scrolling. You can shorten up the columns so they all line up if you want, but the basic structure is there for you to use. You should note that if you want a full range of numbers from 1 to 80 you must use RND(1) in line 20, not RND(0). The latter gives neither a full range of values nor, as stated in the handbook, a repeat of the last number again. Basically, it doesn't work!

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Tommy's Tips

Dear Tommy, The first aspect of the Vic that I came across was POKE (and therefore also PEEK). I gained an understanding of this using the screen character codes and colour codes memory maps in the manual. But when I played in my 16K RAM pack I found these codes did not work. I understand that with the addition of extra memory these codes must have changed but I have not been able to find out what the new values should be. Any help would be gratefully received.

When you add 8K or more RAM to the Vic-20, the following changes take place

- start of screen memory moves from 7680 to 4096
- start of colour map moves from 38400 to 37888
- start of Basic moves from 4096 to 4608

It is regrettable that having made a machine whose moving memory map would make Houdini confused, Commodore failed to give any help to users in the manual; you

will have to buy either the Programmers Reference Manual or one of the many books on the Vic to really learn how to play around with PEEKs and POKEs with any confidence.

Dear Tommy, Could you please tell me if there is such a thing as a complete Memory Map for the 64, that not only gives the POKE locations, but the values to be typed in after them. For example POKE 808,251 switches off the RUN/STOP key, but what other numbers can be used with POKE 808, and all the others. I've tried finding out for myself on my 64 but this causes it to crash quite a lot, and I don't like switching on or off too much.

Also I find that if I use abbreviated keywords after a REM statement, when listed these are all confused and not what should have been listed. Can you tell me if this is normal on the 64, if it should not be used in REM statements,

or if my 64 is faulty? Thank you very much.

I regret to say that I am not aware of any publication that would contain the information you are after. One obvious problem is that there are 655 possible numbers to POKe into each location, only a few of which do anything useful. It would take quite a lot of time and paper to produce all the usable ones and would probably only appeal to a few people since most of the common ones such as POKE 808,251 are regularly published in columns such as these. What most of the numbers do is to send the program to an address where a machine code routine is held or to a jump table which itself contains the address of a m/c routine, obviously it is possible to put your own m/c program somewhere and alter the numbers to jump to that instead, in which case the numbers depend entirely on the memory location required.

On your second point, if you use an abbreviated keyword it is 'tokenised' in the same way as a normal keyword. However, in a REM

statement, keywords are not tokenised when input, unfortunately the token conversion routine does translate all characters which are greater than 128 (not within quotes) back into normal keywords when doing a listing. Since the second 'shifted' characters are all stored as 'ASCII' value + 96 they look like tokens and are translated as such. This is a 'bug-in-the-ROM' problem and it is not therefore advisable to use abbreviated keywords in REM statements.

Dear Tommy, I have a Vic-20 and a C64 64 and I would like to know how I can get hi-res multi-colour characters, for example: a 2x4 character map with brown hair, pink face, yellow body and blue trousers with black shoes, (not sprites) or some other character with two or more colours.

What you need to use is the multi-colour character mode which gives you a choice of four colours per 8x8 dot character position.

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These colours are specified in certain memory addresses, but there are one or two limitations, three of the colours are set for all characters (in this case pink, blue and white) with the fourth colour being changeable for each character position. One restriction on the 64 is that only the first eight colours are available for this fourth colour, hence the man drawn by the program has black hair, not brown!

The second restriction is that the effective horizontal resolution is halved since it requires two bits to define one or four colours, each single character is therefore made up of 4x8 pixels of pixels, rather than the normal 8x8 pixels. The following program will produce what you require on the 64, provided you have access to the Reference Manuals for both machines it is relatively easy to convert to the Vic. Now that in order to keep the character set in the same 16K 'page' as the screen without losing all your memory, the program also moves the screen area into the spare 4K memory space above the Basic ROM.

```

10 CH=47152:SR=50176:REM START ADDR OF 41 AREA:CH1 & LVAR SE115R1
20 F0A=20480:03071:R01ECH+A,32:NEXT:REM CLEAR NEW SCREEN AREA
30 F01E56334,4EEB 156334:AND254:F01E1,REED 11:AND251:REM SWAP CHAR SET IN
40 F0A=010511:R01EDH+A,REED 153248+A1:REXAR:REM TRANSFER CHARS
50 F01E1,REED 11:011A:F01E56334,REED 156334:0101:REM SWAP CHAR SET OUT
60 REM MOVE VIDEO DATA TO TOR 4
70 F01E56578,REED 156578:OR3
80 F01E56576,1PEED 156576:AND253
90 REM SET ADDRESS OF START OF SCREEN AND CHARACTER SET
100 F01E53272,1PEED 153272:AND151:OR3:R01E53272,1PEED 153272:AND2401:F01E64B,200
110 F01E53270,REED 153270:OR16:AND REM SET MAIN 3 COLOUR MODE
120 F01E5327B1,11:R01E532B2,6:F01E532B3,10:REM SET MAIN 3 COLOURS (WHT,BLU,PINK)
130 F0A=010A3:REED 00
140 F01ED1A,0DHET1A
150 F0A=0107
160 READSF:READCF:RENDCL
170 F01E5R+5F,01R01ECP,CL
180 NEXTA
190 GETAF:1FAF * "THEN190:REM PRESS SPACE TO END PROGRAM
200 END
210 REM DATA FOR THE 8 CHARS TO MAKE MAN
220 DATA 1,14,10,28,42,10,8,2
230 DATA 192,176,169,152,168,160,72,128
240 DATA 15,67,252,251,257,207,207,207
250 DATA 40,252,253,252,243,243,247,247
260 DATA 207,143,133,56,56,4,4
270 DATA 243,242,82,80,80,80,16,16
280 DATA 4,4,4,4,4,60,352,204
290 DATA 5,16,16,16,16,60,67,71
300 REM ADDRESSES FOR CHARACTERS & COLOUR MAP * 41H COLOUR
310 DATA 146,55418,8,1147,55419,8
320 DATA 186,55498,15,1187,55499,15
330 DATA 126,55498,15,1227,55499,15
340 DATA 166,55538,8,1267,55539,8

```

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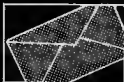
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69

Write away

This is your page: normally we write for you, but here we listen. Feel free to let us know what you think - about the magazine, about Commodore, about suppliers, about life, art, the meaning of existence or whatever. We don't print everything we receive, of course, but anything that might be of specific relevance or general interest will make it to these pages.



Spilling the beans on Kam

In reply to Ian McCooney's letter concerning *Heroes of Kam*: (Commodore, July) you must take the pot of honey beside the piece of meat and proceed to the marsh where the frog is found. Light the gas which will kill the swamp lizard, take the frog and leap it. After doing this, proceed east to the bear and give it the honey. This will enable you to find the gates of Kam. After a little experimenting and locating of certain objects you will discover the significance of saying "Orion" and how to find the bottle. Hopefully I have not given too much away to spoil the adventure for anyone!

Derek Cargill, 62 Windmill Road, Kirkcaldy KY1 3XG.

Warrington club call

First congratulations on a great magazine. I have had a 64 for about three months now and am really getting into it (not literally). Could you or any of your readers tell me if there is a 64 users club in or very near Warrington?

P. Taberham, 29 Linden Close, Woolston, Warrington, Cheshire WA1 4EW.

Variable re-count

In the July '84 issue you gave an incorrect answer to the \$1,000 Competition question on the number of possible variables (shaun or you).

You forgot (or were ignorant of the fact) that **FN, ON, TO, IF, GO** and **OR** can not be used as variable names because they are Basic keywords. These six names give thirty six illegal variables so the an-

swer should have been 3733 rather than 3769 (how about giving me the \$1,000 prize instead).

Also, how about a few more '84 vicinals. There seems to be a lot more for the Vic than the greatly superior 64.

Anyway, apart from these quibbles I find it a really good magazine: informative, interesting, lively, amusing... and good value for money. I particularly liked *Interfield's* Series on the 64 video. As a suggestion for future articles how about reviewing some *Vic64 Flight Simulators* and even offering a good one in your *Deals for Readers* section?

Richard Phipps, 23 Lancaster Drive, Felgate, Devon.

We're reviewing a whole batch of simulators in the next issue - Ed

Not-so-simple Simon

I have not yet seen in your magazine any problems relating to the *Simon's* Basic cartridge. I have a few queries about it. Firstly the Design-command used for sprites does not seem to work correctly. After typing in the example program from the manual, the program runs once then fails to run again: it won't even list. The command illustrated in *Design 6, 2048*.

Also can the user-defined graphics Design command be used to create multi U.D.G.s, and can U.D.G.s be used on a Hi-res screen?

I live in the middle of nowhere and don't know anybody else with a Commodore 64. I have tried Commodore but as per usual to no avail.

T. Waterhouse, 114 Huddrake, Haslingden, Rossendale, Lancs BB4 5AT.

Rossendale isn't quite in the middle of nowhere. Still, can any *Simon's* Basic aficionados come to the rescue?

Simon, yet again

I am writing concerning something published in your magazine about

a lux bug in *Simon's* Basic (Feb & March '84). First in Tommy's Tips then in the news page instructions were given to obtain a listing to printer; however I would like to pass on to other readers that I have never had to do this, the instructions in the printer manual work ok. This is with MPS 801 printer. Perhaps this has something to do with it.

Secondly I would like to congratulate you on including the analogue clock in *Simon's* Basic in the May issue, I'm sure I'm not alone in hoping to see more programs in future using this package.

The third thing may seem like an odd question but there are times when I would like to exit *Simon's* Basic without unplugging the cartridge (simply to avoid plugging and unplugging all the time to save wear and tear on the cartridge edge connector).

I realise this will mean using a switch as the Game, ExRom and Power line needs interrupting. I wonder if any reader can offer advice on this. The main problem is getting inside the cartridge, could you tell me if these are glued or is it possible to part it or is it necessary to break it?

Dale Stammers, 16 Windsor Drive, Moughton-le-Spring, Tyne & Wear.

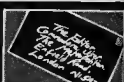
The reviewer reviewed...

Referring to the recent review of games in your issue dated July '84 for *Neoclypees* for the Commodore 64. We would all like to believe that LS must have had a good meal before reviewing it, work for the company who make the program, or be 'Willy of the Week'!

What we appreciate people here and opinions of games vary dramatically, on the strength of the overwhelming remarks made we bought the cassette.

Oh dear: even in our limited experience it falls far short of *Defender* on Atari VCS and similar games on our previous computer, the Vic-90.

On a more general note we are



concerned with some of the poor quality of games for computers on the market at present. There is, very often, little chance of seeing the game on display and one's choice is very often determined by comments and opinions expressed in magazines such as yours. Bearing in mind that in many cases young people in particular, could have saved to buy new games, this is unacceptable.

Come on game writers and companies, we need more examples such as *Beach Head* and *Space Pilot* to name two of the best. No wonder there are No 1 and No 2 in the charts. If one or two companies can do it at very reasonable prices so can the rest. There are obviously many games we have not yet seen - there may be some which conform to our previous examples. If so, apologies to the companies concerned for generalising.

But are we oversteering our case?

A.C. Jackson, 6 Tudor Road, Grosvenor Court, Fortlehead, Avon BS20 3UR.

There's probably a great deal of truth in what you say about the general quality of games. That problem is often compounded by a dire lack of originality. We're lucky; we don't have to pay for the games we see. Actually throwing away money on bad games is something we don't experience. Do other readers have gripes about their own bad buys?

More slips with disks

The letter from D.J. Morgan, in your July issue, filled me with hope. Here I thought, with the answer to the "disappearing document" mystery which has plagued me for nearly a year!

But though I had managed to

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Race along the conveyor belt leaping the packages, and shin up the ladders to the shopfloor. Pitchfork the Gremlins off the walkways, use the poison pouch to trap the Giant Rat, and retrieve the oilcan to keep the generator topped up.



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GENERATOR

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into musical notation. With the addition of an optional graphics printer you can turn your

A collage of musical instruments including a guitar, drums, and a trumpet. The instruments are arranged in a dynamic, overlapping fashion against a light background. A red electric guitar is prominent in the foreground, angled towards the bottom right. Behind it, a black drum set is visible, and a brass instrument, possibly a trumpet or trombone, is positioned above the drums. A black electric guitar is also visible in the upper left corner. The overall composition suggests a theme of music and performance.

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MUSICALCUK
The Paradox Group
The Metropolitan
Enfield Road
London
N1 5AZ

Single-line Competition

● April and July one-liner winners ●

With two batches of entries to contend with, our keyboard prodders looked like having a good time. Alas, their eager anticipation was dashed by too many psychedelic screens, hardly legible writing, programs that just wouldn't run and a general lack of real imagination.

So we've restricted the Honours List to three for each month. Sweatshirts are already winging their way to the chosen few.

Remember, you may have to use abbreviations for Basic keywords to squeeze the listings into the required one-line length.

April

Islands of Barbados, West Indies

1 INPUT "CHARACTER",C\$ PRINT "C\$ PRINT "POKE "PEEK(1024) PRINT "CHR\$ "ASC(C\$)

Albert Flattner of County Waterford

- this one really got us turning our heads

Jyrki Holopainen at Virkkala, Sweden

- make use of your function keys (press F1 and F3 to get the two graphics characters)

July

8 Davis of London

INPUTS FOR L=3208STEP=1 P=16 N H2=0.7 D=D-H2*P
END PRINT OUTGO
- solves your decimal to hex conversion problems

Simon Varyard of Chiddingfold, Surrey

1 00RT+120T0254 0001+00024T020079 0001.T NEXT1 00ENERG01.T-100 NEXTT

Andrew Hanney of Cardiff

- a one-line drawing program? Not quite but it's good fun. Use '-' to go left '1' for right '3' for up and 'w' for down

Announcement to ADVERTISERS

Paradox

Announcement to
ADVERTISERS

Paradox

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Paul Helme
01-241 2493

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After you or a complete production service
might be an advertisement or a brochure, or a
whenever your requirement we are able to
drawing and layout or design
of just a part of the process, we
with a tight budget keep
to help and able to please.

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a creative flair. Perhaps a manual
stage manager or from the drawing
production of just a part of the process, we
with a tight budget keep
to help and able to please.

expansion of our studio now means that we can
perhaps a manual
stage manager or from the drawing
production of just a part of the process, we
with a tight budget keep
to help and able to please.

non-writing proven expertise with a
promotional brochure
to conceive it stage manager or from the drawing
production of just a part of the process, we
with a tight budget keep
to help and able to please.

Graduate to the grave to achieve quality within a tight budget keep
to help and able to please.

Paul Holmes
01-241 2493

Paul Hulme
01-241 2493

keep clear of this sort of accident for a month or two, it happened again last night. This was the sequence

- I finished a longish document ('A') and saved it to disk to replace a shorter version of the same document.
- I then loaded from disk another short 'document' which simply gives my own address.
- I next performed the Vitalize command for changing the name of that document to 'B', and proceeded to write a letter, subsequently printing it and then saving 'B' to disk under the name 'B'.
- I then tried to load 'A' but 'B' appeared on the screen.
- I tried to load 'B' and 'B' appeared on the screen.
- Fortunately I had taken a back-up copy of 'A' on another disk, so I loaded this into my CBM 64, changed that disk for another one from which 'A' had vanished, and saved 'A' to that disk. Now when I try to load 'A' from that disk I get 'A', when I tried to load 'B' I get 'B'.

As is now well, therefore. But it

would not have been if I had failed to take a back-up copy. As 'B' is much shorter than 'A', this case does not accord with the one Mr Morgan mentions.

What, then, is the answer? The only one which has occurred to me is to use a new disk for each document: then, when you save the amended, and perhaps expanded, version of your masterpiece there is nothing else on the disk for it to overwrite. I appreciate that this is an expensive way of coping with the problem, but if you keep hard copies there usually comes a time when you can scratch each document, so that you have a new disk again.

Does anyone have a better answer? It took me a long time to satisfy myself that overwriting was the cause of all the trouble. I thought when I read Mr Morgan's letter that we had now been given the missing clue, that the overwriting happened when one replaced an existing document with an expanded version bearing the same name. But as my review experience shows, it can happen somehow that you overwrite an

existing document when you are saving an entirely new document, under a new name.

I suppose that by some quirk the document may get itself into two places on the disk at once... in its own slot, so, to speak, and also in the slot of the document which it accidentally overwrites. Any ideas?

Peter McDonald, 254 Leigh Road, Worsley, Manchester.

Delving into Easyscript

In reference to the letter from Mr R.C. Medford in the July issue regarding hidden musical talents of Easyscript, this was no doubt laid by the perpetrator waiting for somebody to find it as Mr Medford has done CTRL and pound sign produces the same result of playing Land of Hope and Glory.

Now, encouraged by the musical effects I tried other combinations and obtained some interesting results. It would take too long to type them all out, but in edit mode, '3'



and 'T' change the background colours very fast. CTRL and 'g' produce a pattern of 'C' by default, otherwise filling the screen with alternate g's and spaces, others produce scrolling, double speed cursor ('b' and 'c' do that) while M deletes all below and puts a reversed '<' sign in every row column. I fortunately none produce the Star Spangled Banner! Those worth trying with CTRL in keyboard order, are: g, e, t, a, s, d, f, g, -, m, and ctrl/right. Others produce results, but less spectacular. Can any use be made of that talent? I wonder? At the same time I wish somebody would tell me how to get the 64 to talk to the Brother HR16 other than by Easyscript! I can get no back-up from the firm who sold me the printer I wanted! It would be superb if I could persuade the 64 to accept it.

D. Oakley, Dryland House, Chalfont, Chesham, Bucks.

THE ANATOMY OF THE 1541 DISK DRIVE

This 300+ page book is the most comprehensive guide available for the 1541 disk drive. Users who wish to gain a deep understanding of the operating system.

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For the CBM-64 or Vic-20 (RK+), this package contains most of the language elements found in the fig-FORTH standard. Forth programs are usually faster and shorter than Basic and the



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The ANATOMY OF THE COMMODORE 64 is a 300 page book for the CBM-64 owner who wants to gain a better understanding of the lesser known features of the computer.

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- The next step - assembly language programming
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Dealers enquiries welcome.
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Vic-20 Data File. Takes the place of any card index. Facilities include: save, load file, full sort/print all/print records/amend, delete records, memory remaining, etc. Needs +8K expansion min. Cassette \$4.50 program can be used with all direct connect Vic print inc 1500 printer port. Fast delivery by first class post. Send cheque PO to A&C Software, 51 Ashtree Road, Twidale, W Midlands B69 2HD

Program listings \$1.10 Send tape or disk. Radar, Rat Race, Music Composer, Lazarus, Cartridges \$7.00 each. Software swap includes Zaxxon, Pole Position, Marcus Reddy, 80 Watergate Road, Newport Isle of Wight.

At \$100.00 plus accessories cassette recorder, Quick-Shot joystick, 5 games, Arcadia Race Hopart, Blitz, and one Space Invaders cartridge. Tel: 612399 CM-Hugh & Co. Town Park, Belfast 11

Wanted CBM64 software, games, educational. Swap self exchange also swap ideas etc. Phone: 051 423 5493 after 6.00pm

Wanted penpal age 13-15. Must own Commodore 64. Reply by program on tape to Pete 12, Holwood Road, Chorley F17 2JZ

Penpal wanted aged between 15-17 and must be female also must have a CBM64. Any overseas females welcome. If interested contact Anthony Ford, 61 Jessel Drive Loughton, Essex IG10 2EL England. All letters received will receive a reply.

CBM64 software, Unisynth64 \$10. Grand Master Chess \$11, Mastercode Assembler \$10, Arcadoball \$4, Gridrunner \$4, A.M. Cornels \$4, Cyclones \$3, Disco \$6, P. Redgewell, 10 Windhill, Welwyn Garden City Herts. Phone 34437

1520 printer plotter (boxed) 3 months old for sale \$80.00 o.n.o. Write David Flint 10 New Market Street, Buxton, Derbyshire

Half price Vic-20 plus 16K C2N Fortminter joystick, \$80 Software: Boss Jelpac Bonzo etc. original packaging and plastic computer and C2N box. Worth \$350. Offers \$175! Tel: 0332 798865 after 5.00pm and

Vic-20 for sale plus C2N recorder. Super Expander Introduction to Basic PI. Quickshot joystick, game cartridges, over \$60 worth of software and disc/covers. All for \$190 only. Ring 021 554 6493 after 4pm

Vic-20 cartridges The Count and Prote Cave, will swap for Adventure Land and Voodoo Castle. R. Jones, 11 Oxford Street, Deneside, Seaham, Co. Durham. Phone Seaham 813676

Commodore 64 software to sell or swap. Titles include: Right Simulator II, Zaxxon, Mario Miner and many others. Write A. Gerard, PO Box 116, Ligeux 4, Belgium. (All letters answered)

Wanted Softswitch cartridge copier for Vic-20. Original price and all your plus paid. Write to Gerard Harrington, 141 Saint Brendans Road, Fairview, Cork, Ireland

Vic-20 Computer \$55 101 programs, 11 top titles, 70 games, 20 educational \$15. Super Expander \$12, cassette unit \$20 joystick \$3, 4 books - Have original boxes. Sell together \$100. Tel: 01-452-4 10 (After)

Printer for 64. MPS 801 dot matrix printer 5 months old. max. ed. \$150, still boxed. Phone: 041 Uckfield 4296

Wanted CBM64 and 1541 disk drive John Robertson, 1 Old Edinburgh Road, Inverness IV2 3HF

Help! Does any one know the four clues to the action game in "Four Gates to Eternity" let me know before I go mad! Ring Keith 0203 319587 evenings

Swap 3 Vic-20 cartridges, Radar, Rottor, Jupiter, Lander, Sargan II Chess for Vic 3K RAM pack

1515 printer - nearly new perfect condition, with nearly 2000 sheets paper \$135. Also for sale - Artex E. Janssen chess. Programmer's Reference Guide. Phone for more details. Bransgrove (0527) 76815 (in Birmingham)

CP/M package for CBM64 includes 280 cartridge, CP/M disk and manual. Hardly used, as new. Will sell for only \$30. Contact Gavin, 01-954 4545

A 16K RAM pack for Vic-20. Unwanted gift \$20. Telephone. Leaflethead 375801 evenings

Exchange or swap Chinese Juggler tape suitable for CBM64 (joytick required). Contact David Sayers, 7 Alandale Park, Eppingdon, Londonbury, N. Ireland. Tel: 0504 810763

Wanted 2031 or 3040 or 4040 disk and with or without cables to suit 3032 C2N and Dolbin 8080 Ring 359 6376, Cardiff. 36 Beechledge Birmingham 20 TLA. Will collect

Vic-20 and CBM64 listing service. Vic 20 (16K) only \$1.00 and use CBM64 \$1.20 and so on. Please send cassette so to John Walker, 14 Leaside Loan, Lonsdale, Greenhead, Tyne & Wear NE10 8NT. Fast return c/c cassette and printed listing whenever possible by return of post

1541 disk drive and 170 - 1541 wanted for Vic-20 in good condition, reasonably priced. Telephone: Tetford 739. Tel: 83m

Swap Attack of Mutant Cornets for Falcon Patrol and swap Lorian on cartridge plus BMX 2Acers for The Hobbit. Jordan McClements, 19 Newcastle Road, Penrhy, Co. Down, N. Ireland. (02477) 71888.

Vic-20 plus C2N 535 of games including Arcadia, Gridrunner, Voodoo Cartel plus Programmer's Reference Guide plus manual etc. plus \$15 of Vic magazines and disc cover and cards \$99. Telephone before August 18th (021) 554 8780

Vic-20 Software Hire
No membership fee! Quotely titles (eg. Skyward, Jelpac, Right 015) from 50p per week. Already 500 delighted members. Join them now! All games originals. Send 2 x 1p stamps for your Hirekit to:
VSHQUK, 242 Ransom Road, Mappertrey, Nottingham.

Ace game Quasimodo. Guide Quasimodo over 15 different scenarios to rescue Famielinda from Count Dracy. Price is \$5.00. The game is for 8K Vic-20. Phone 566 1485 after 4.30pm and ask for Chris

Searching for a computer fan for exchanging programs with computer fan in Germany. Write to Frank Undermann, Grüningsweg 128, 4600 Dortmund 13, West Germany. Tel: 010492311212011. (Only Commodore programs)

Commodore 64: wanted: English software to exchange for American. Dels only please. Send for list (300+ to choose from), to Martin Duffy, 3731 Park Ave. Worthing New York, USA. Please send list of your progr.

Programs-exchange: CBM64 disk. Have over 1250 programs, will send complete list in return for yours, if exchanger! Øivind Amlien, Lillestrøm 97 N-1475. Hinstadjordet Norway

Australian C64 owner would like to hear from English/European owners, exchange ideas, listings, programs whatever. Also have Australian marketing contacts for your own programs. Post Box 308, Wileton 5155 Western Australia

More C64 programs! 15 year old boy wants to swap programs. Anyone anywhere in the world. Send me your list: Michael de Brégis, 17 Ridge Road, Hilsenre 3610 Natal, South Africa

64 Edit File utility program. A must for anyone using or wishing to use sequential files. Program creates adds, subtracts, amends, sorts, prints and saves/recalls to disk or tape. Send \$3 with disk or tape. J. Aiken, 43 Brodie Ave. Metherell. Returned by next post

Commodore business computer system, 8000 series, c/m using 1 96K computer, 1 disk drive, 1 matrix printer. Write now end July 1983, offer 1m15. Contact 051 477 4020

Games galore for the Commodore 64. Ice Cream run a fleet of ice cream vans for a week and make as much profit as possible \$6.50. Yohzee, a computer version of that classic game \$6.50. For full catalogue send a sale or cheques/PDs to Michael Smith, Enderbury Lodge, Bantbridge, Co. Down, Ireland BT32 3BS

Vic-20 users wanted for swaps and regular contact between England and Australia, help purchase of software not available in opposite countries. Contact Ivan Jarvis, PO Box 198, Engadine, Jarvis

SIFIED

Machine Code programs to swap Send yours on cassette (R swap mine) I'll accept Basic programs J Y Sreacu, 18 Chemin Du Clos Saint Martin L'Etang La Ville 78620, Yvelines, France

CBM64: I would like to exchange my software (I have more than 600 programs) Please send your lists to: Fernando Fomer, Via Valpurga Cokato, 21 10125 Torno Italy

UCIA student seeks C64 programs and info as well as international correspondence - all letters answered, whether computer related or not Write to Tony Freeman, 4323 Lowell Ave, Glendale California 91214 USA.

82 fantastic games for the Vic-20 unexpanded Mission Attack, Cosmic Cars, Galaxian, Dodge Race Track, Alien Revenge, Graphic Aid Send \$4.50 to Paul Droke, 8 Cosham Close, nr Bangscliffe Harls.

Vic-20 starter pack with 16K RAM pack, joystick, over 100 games and about 25 computer magazines Only \$15.00 Paul Droke, 8 Cosham Close, nr Bangscliffe Harls.

Vic-20 girl penpal wanted Must be aged between 13-15, but does not need much experience or programming, if interested please write to: Michael Lennan, 109 Clive Road, Fratton, Portsmouth, Hants.

Vic-20 plus C2M 16K RAM Super Programmer, motherboard, 4 slot switchable, all based on new magic software - Krazy Kong, Pharaoh's Tomb, Jet Pack, Games and Utilities, only \$175.00 Will split items Northwich 780475.

Commodore 1520 printer printer only three months old \$75.00 Steve Knight, 257 Byron Road, Harlow Weald, Harlow Essex, 427 5735

Vic-20 Computer (brand new) plus switchable 16K RAM pack, Soft copy: Jetpack, Arcadia, Tornado, Grandrunner Four game Tornado, two issues Vicopak Will split please to Stuart phone Newmarket 663276.

Poker, the classic gambling game Offered to Vic-20 (16K RAM) owners for only \$7.95 p&p free from PO Box 1, Chaffers, Cambs PE16 6UR

Commodore 64 software All originals, cost over \$50. Nine games including Beach Head, Slurp, Odyssey Scooper Frost, Cyclons, Monster Munch etc. Wants to swap for Speech Synthesizer Phone (0752) 334419

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Ad - Index

Abacus	28	EMV	38
Adamski	75	Integrated Systems	58
Ange Productions	68	Interface	43
Amag Computers	10	Isma Computers	28
Amag Micro Services	58	Mico-Centri	52
Aquatic Software	62	Muni-la Bay Conshary	68
Bubble Bus	17C	Macropower	53, 71
Brennell	65	Ocean Software	49
Calco Software	45, 59	Pullman Microsystems	7
Centre Sub	15	Richard Shepherd Software	44
Chesley Soft	30	Simple Software	68
Chironex Electronics	35	The 64 Software Centre	35
Chromas	38	SMF	75
CompuSana	13	Software Supermarket	41
Crescent	32	Sophisticated Games	58
CW Computers	33	Stack	15
DACC	48	Stack	15
Deatview	39	Seascope Electronics	60
Electronic Arts	58	Therling	6
Exis Soft	42	Wandage	46
Graphic Response	58	Zen Electronics	22
	MOO		24

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